Ogofa 5

Spring 1997

GWYNEDD CAVE & POTHOLE CLUB

Ogofa 5, Spring 1997 - CONTENTS

	Page
Contents	1
Editorial and Secreterial	2
Klondyke Lead Mine and the Geirionydd Gorge	3
Yorkshire Weekend - January 1997	7
Clogwyn y Fuwch Slate Mine	10
St Tudwal's Peninsula Mine, Lleyn - Penrhyn Du, Porth Neigwl & Trwyn Cilan	10
Slate Formation - a Tectonic View	13
Software Notes	18
Llanailhaiarn Manganese Mine	19
Some More Llandudno Caves - Pant y Wennol & Tan y Bryn	20
Reconnoitering - Rhyd, Catherine & Jane, Aberglaslyn & Brynfelin	21
Iron Mining	22
Nant Ffrancon Mines - Cwm Ceunant, Gwaith & Ceunant Arsenic Mine	23
Pant-y-wrach Copper Mine	26
Bwlch-y-plwm Lead Mine - History	32
A Surface Tour of Bwlch-y-plwm Mine	34
Bwlch-y-plwm - Surveys and area map	36
October 1997 Rescue Practice	39
Some more Bwlch-y-plwm photos	40
Lliwedd Copper Mine	41
Tenerife	44
Kirk Gill Cave	47
1996 Synopsis & Assorted photographs	47
Of Sharp Edges and Tin Men	48

Unless otherwise indicated, © 1997 Gwynedd Cave & Pothole Club. *Bwlch-y-plwm Lead Mine*, Page 32 and *A Surface Tour of Bwlch-y-plwm Mine*, Page 34 are copyright property of Harold Morris, Porthmadog. Other extracts credited and copyright acknowledged as indicated. Articles copyrighted by the Gwynedd Cave & Pothole Club may be reproduced without seeking permission as long as the source is credited.

Introduction to 2023 Pdf version. Since the original paper versions of *Ogofa* were published in the mid 90s, a number of articles have ended up being referenced in other works. In order to make the publications more widely available, remastered Pdf versions have now been produced, with copies placed in relevant web repositories. Original text is reproduced verbatim, drawings have been redrawn, the original look and feel are kept where possible - although typefaces may vary. Where there are corrections or amendments, these are flagged as $^{\dagger n}$, with corresponding text appearing at the end of the publication.

Robin Griffiths, January 2023

Editorial/Secretarial

Welcome to *Ogofa 5*! This issue has taken a bit longer than usual due to various reasons. It has been decided to raise the price of this issue to £5.00 including postage, the reason being that most *Ogofa*s are issued freely to club members or to various other caving bodies and interested groups. Consequently, production costs need to be offset to a greater degree by *Ogofa* sales.

We would also ask receivers of free copies of *Ogofa* to consider making a discretionary donation to the North Wales Cave Rescue Organisation. This should be sent to the Treasurer Tim Palmer at 51a Victoria St., Oswestry, Shropshire, SY11 2BW.

The majority of last year was occupied with explorations around Blaenau and Penrhyndeudraeth and this is reflected in this issue.

Discussions & decisions taken at the February AGM included:

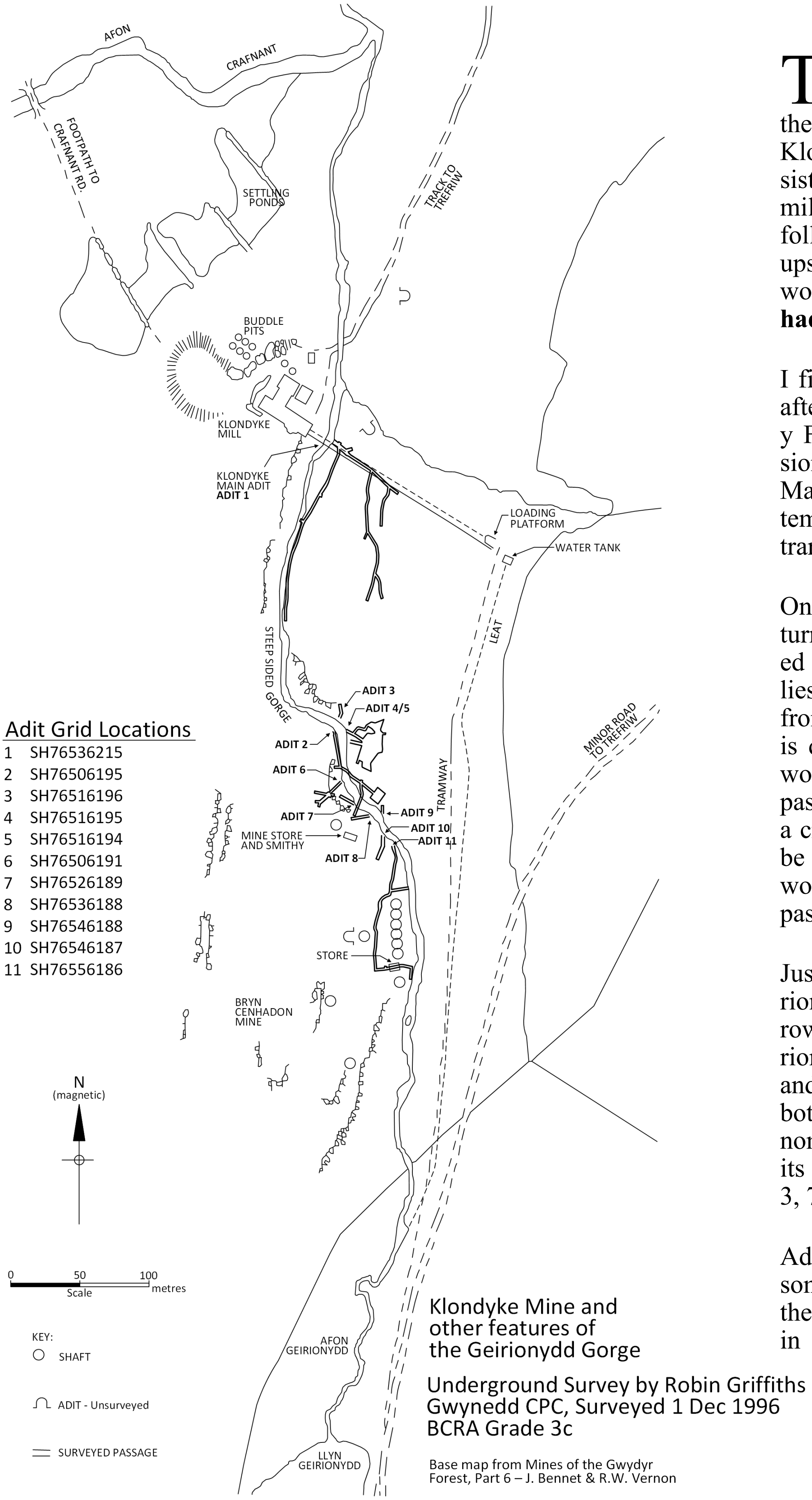
- A membership drive
- Monthly meetings to be held at Plas y Nant, Betws Garmon on the first Monday of the month.
- Installation of Andy as Rescue Liaison Officer
- Identification of future projects

A start has been made on the production of a Gwynedd Mines 'database'. The purpose of this is to collate underground information from existing publications and from personal experience in order to act as a form of guide. The primary purpose of the database is for Cave Rescue information purposes, and preliminary copies will be issued in the near future. The use of the database as a general underground guide for cavers is another potential purpose - although any ramifications (in terms of access etc.) will need to be addressed first. This will be an ongoing project and information from interested individuals on various sites would be very welcome. This is particularly so for Llanrwst and the Meirionydd Gold belt.

Robin March 1997
e-mail: ~~Robin_Grifths@TandN.com~~

Klondyke Lead Mine and the Geirionydd Gorge

by Robin Griffiths



Adit Grid Locations

1	SH76536215
2	SH76506195
3	SH76516196
4	SH76516195
5	SH76516194
6	SH76506191
7	SH76526189
8	SH76536188
9	SH76546188
10	SH76546187
11	SH76556186

Klondyke Mine and
other features of
the Geirionydd Gorge

Underground Survey by Robin Griffiths
Gwynedd CPC, Surveyed 1 Dec 1996
BCRA Grade 3c

Base map from Mines of the Gwydyr Forest, Part 6 – J. Bennet & R.W. Vernon

The site of the old **Klondyke Lead Mine** is dominated by the impressive remains of the old Klondyke Mill. The mine itself consists of one main level adjacent the mill and numerous smaller working following the Geirionydd Gorge upstream, although some of these working are part of the **Bryn Cenhadon Mine**.

I first visited the site during spring after a visit to the nearby Clogwyn y Fuwch slate mine. On this occasion I just visited the Klondyke Main Adit. The adit numbering system adopted in this article is arbitrary.

On Sunday 1st of December I returned to do a survey. Again I visited the main adit (ADIT 1) which lies immediately across the stream from the mill. The entrance section is quite large and stone lined. The workings basically consist of three passages trending southwards from a cross cut. There does not seem to be any great signs of actual lead working despite the fairly extensive passages.

Just upstream from here is the Geirionydd Gorge which is quite a narrow ravine leading up to Llyn Geirionydd. Them are numerous small and more extensive workings on both sides of the river here. Small nondescript workings are those Adits marked on the map as numbers 3, 7, 8, 9 and 10.

Adits 2, 3, 4 and 5 are just below some cascades in the river. In fact the entire river drops down a shaft in the river bed and emerges as a

⇨

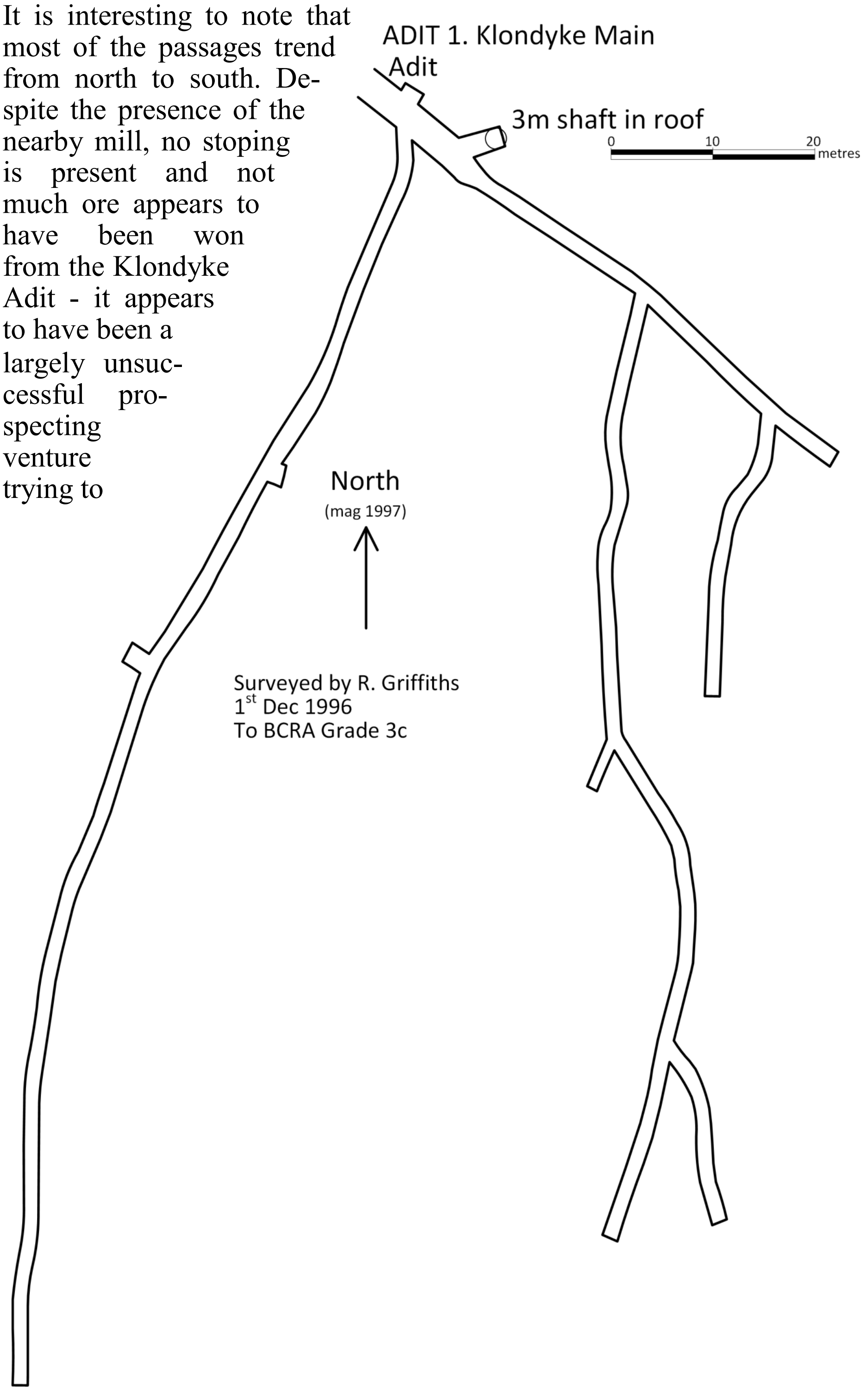
foaming cascade from a small mine level (not numbered). Numbers 4 and 5 are linked and lead to a quite large slope which is about 2m high and dips at about 20° to the west. As ADIT 4 enters the stope there is a large timber lined door frame.

ADIT 2 is on the opposite side of the river and is basically a single passage leading to a small stope with a single side branch. The survey shows the passage to go underneath the river onto the opposite bank. This is accomplished because of the climb in river bed above this group of entrances.

ADIT 6 is a short length of passage leading to a square section flooded shaft. The shaft appears to vary from about 5m to about 10m in depth, although it could be deeper. Ladders and old timbers can be seen in the water. It is possible to cross the shaft by crawling on some old timbers, but both branches of the subsequent fork quickly terminate.

ADIT 11 was the most southernmost adit surveyed. This soon enters a steeply inclined, narrow stope with a surface shaft above. Onwards a passage to the left exits to the river bank again. The main passage terminated just after a ninety degree bend where there is a shaft in the roof with a timber frame type structure supporting a pile of deads. The survey shows this point to be in the vicinity of a number of surface workings belonging to Bryn Cenhadon Mine.

Upon surfacing I followed shaft and stopes in a line parallel to the river. These were not entered on this occasion.



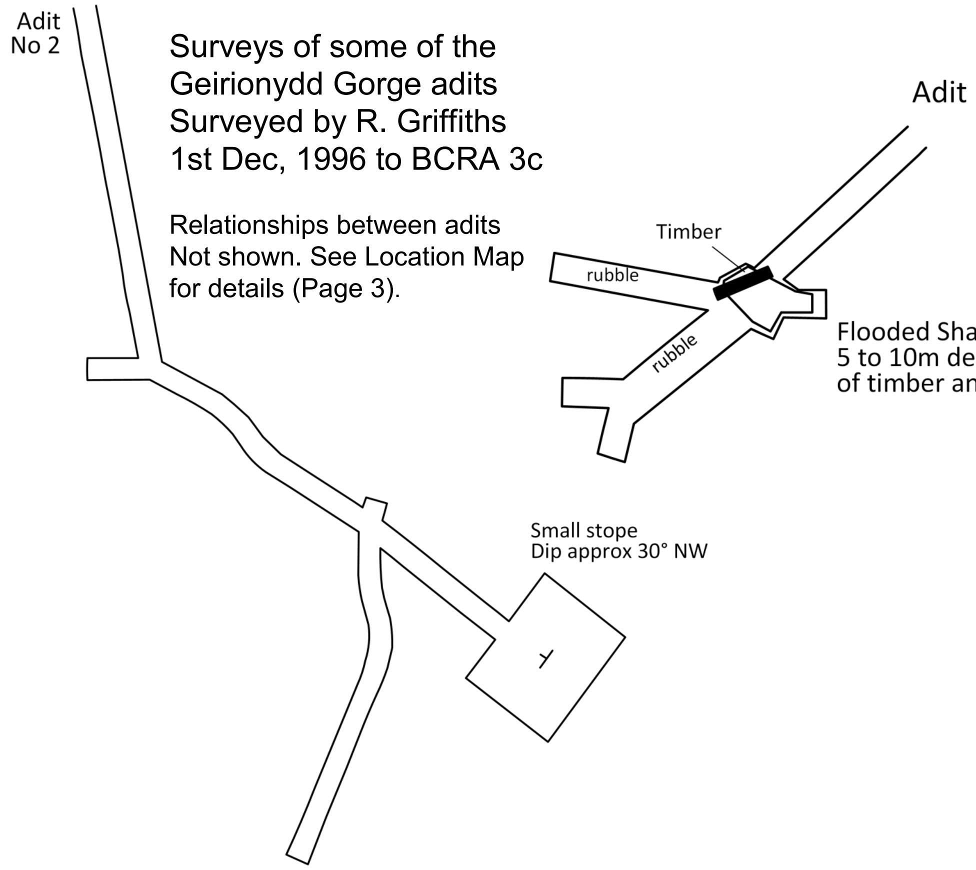
Surveyed by R. Griffiths
1^{st} Dec 1996
To BCRA Grade 3c

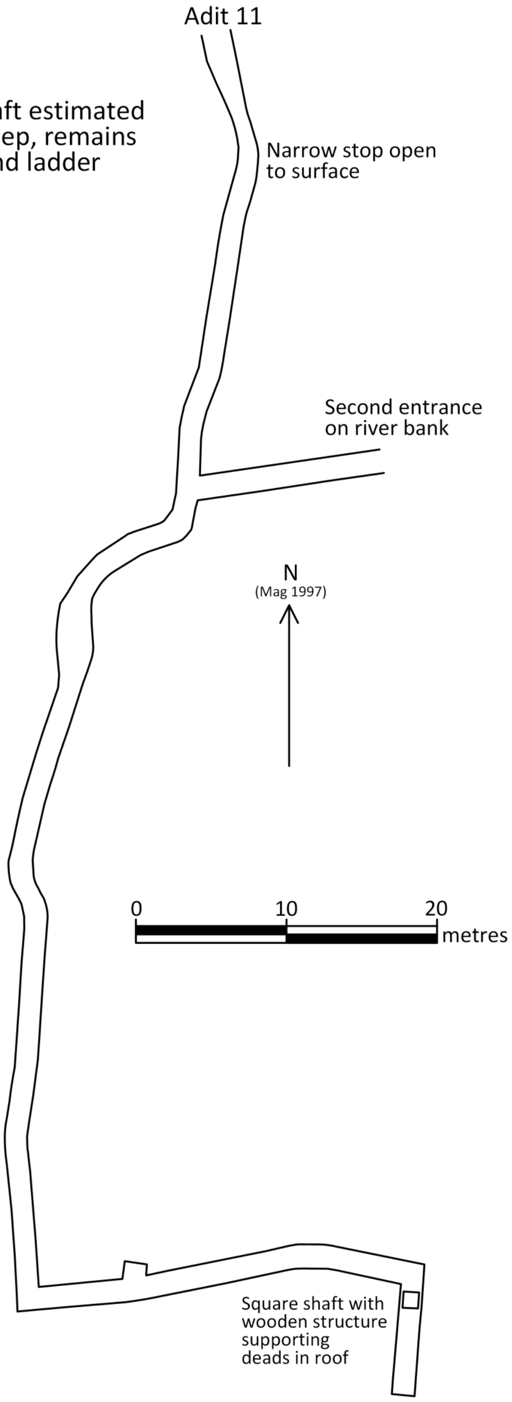
It is interesting to note that most of the passages trend from north to south. Despite the presence of the nearby mill, no stoping is present and not much ore appears to have been won from the Klondyke Adit - it appears to have been a largely unsuccessful prospecting venture trying to intercept the veins that had been exploited in the older Bryn Cenhadon mine further up the gorge. The levels further up the gorge - although smaller in extent have extensive stoping testifying to the ore removed. ⇨

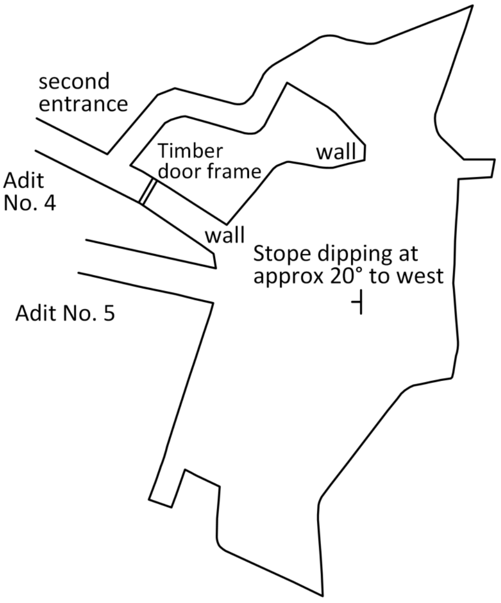
The mill itself was built in the early 1900's and processed ore from the Pandora Mine near Llyn Geirionydd. Ore was transported via tramway and then aerial ropeway to the mill. The Klondyke achieved a degree of notoriety just after the First World War as the scene of an elaborate fraud - See Inset. (based on description in Vernon and Bennet's Gwydyr books)

Surveys of some of the Geirionydd Gorge adits
Surveyed by R. Griffiths
1st Dec, 1996 to BCRA 3c

Relationships between adits Not shown. See Location Map for details (Page 3).



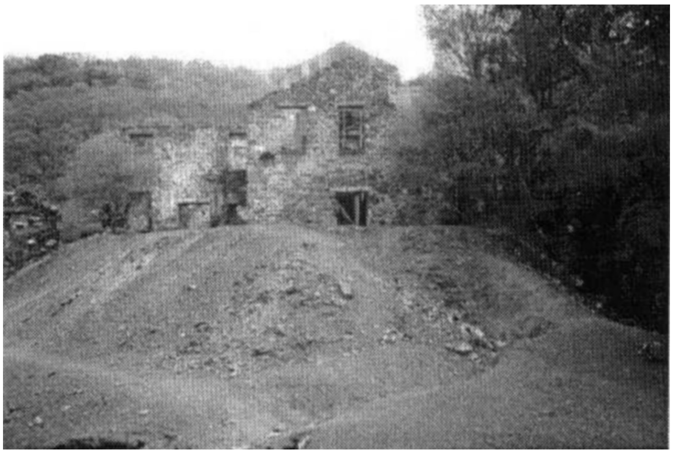




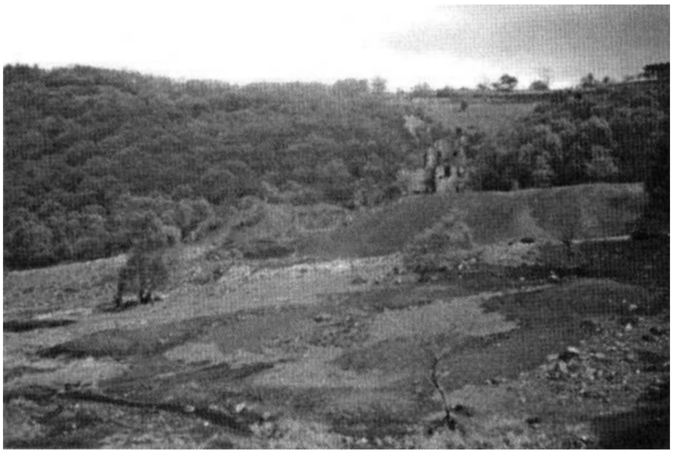
The 'Klondyke' Fraud

It seems that during the period 1918 to 1921, the Klondyke was the scene of a massive fraud. The story is related in some detail in *Mines of the Gwydyr Forest*, but briefly what happened was this. A certain Joseph Aspinall took over the mine in 1918 and claimed to have discovered a huge vein of silver. What he did was to clean the passages of dirt, purchase 20 tons of powdered lead concentrate and glue it onto the walls giving the impression that the entire passage passed through a huge vein of silver. He then bought parties up from London to view the vein and procure an investment in the venture. A mass of miners were employed who actually did no work, let alone any mining. Whenever Aspinall turned up with a viewing party, a hoot of his car horn triggered the miners to busy themselves around the premises -some guarding the adit with cudgels, others running around the place like ants on an ant hill. By the time he was rumbled, he managed to secure £166,000 ! He got 22 months.

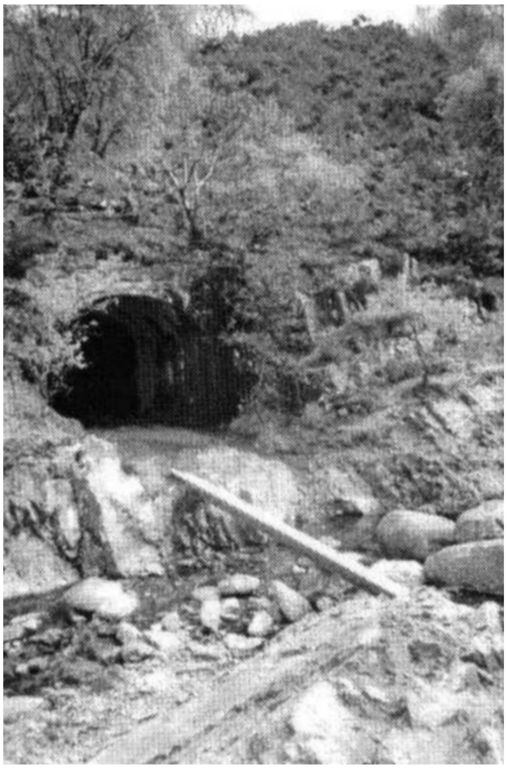
Klondyke & the Geirionydd Gorge



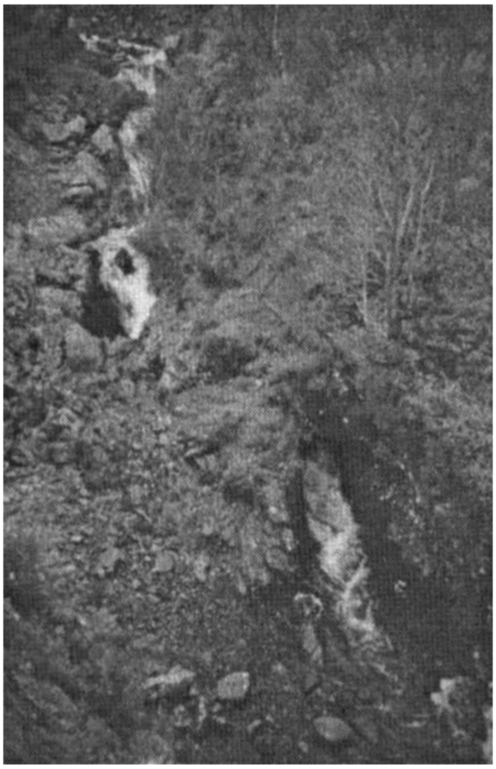
Klondyke Mill



Klondyke Mill & mine tailings

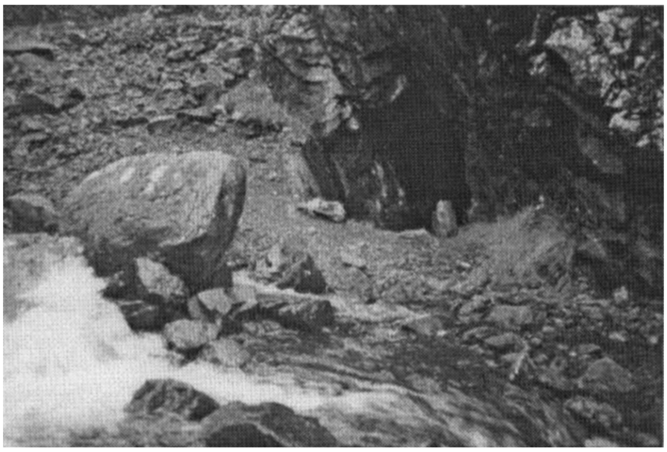


Klondyke Main Adit Portal



Adits in the Geirionydd Gorge

Adit 6 - Across the flooded shaft



Adit 6 Entrance

Yorkshire Weekend

Date: 17th January 1997

Attended by: Dean Mannion, Robin Griffiths, Robert Davies, Brian Davies along with various members of the Flat Learning Curve Potholing Club, who had the permits.

by Dean Mannion

The start of the weekend developed according to a standard format; Bert and I did a frontal assault on Ingleton on the Friday evening with the Davies clan bringing up the rear early on Saturday morning to be rallied at 10:00 hours sharp in Bernies along with Richard and Mandy from the afore mention F.L.C. potholing club. Well Nearly !

Due to our envisaged energetic exertions early on Saturday, we decided that a leisurely pace was in order - hoping to converge on the Marton Arms for a quick pie and pint before retiring to our room to ponder on the following days activities. On the whole, this plan went fairly well until the retiring bit, when the landlord scuppered our plans in one fail swoop by mentioning “Oh your residents are you? Well have another pint then!” He proceeded to force us to drink pint after pint until we could take no more at sometime after 01:00 hours (I think).

A quick Breakfast at 09:00 (well it was about 10:45 after the landlord had shoe horned us from our beds) and off to meet Mr Brian. This turned out to be a little easier than anticipated as the fore mention Brian (Mr Cholmondely Warner) was already to be found at our breakfast table making good use of certain items of our breakfast ensemble -namely the tea and toast. Anyway, fortunately the Flatties had also been unavoidably detained and the meeting went more or less as planned.

Trip for the day. A short hop to Leck Fell and a foray down Big Meanie, Short Drop, Death’s Head and Gavel Pot All being within a few hundred yards of each other and with such a big group (about 12 persons), it was thought better to split up and start in different pots leaving the derigging for another team. Our first target was to go down Short Drop and resurface through Gavel. The journey down through Short Drop was uneventful (some say fortunately) until the head of the last pitch was reached where we found another party who insisted we shouldn’t be there and we can’t have done Short Drop already. Maybe the Ed could include a diagram to prove either way as I can’t remember the outcome of the discussion. (*Ed*. Basically the open pot at Gavel leads to two shafts, one into Short Drop and one into Gavel. They rigged into Short Drop by mistake - I think !). A quick abseil brought us to the bottom of the pitch and to the boulder blocked bottom of Short Drop (Or was it ?). (*Ed*. Yes) The order of ascent of this small but quite moist shaft proved to be significant as I found to my displeasure.

Brian went first and upon reaching the top decided to build a nice little dam out of tackle sacks and bits of his anatomy, thus bringing the water flow to a momentary halt before letting some go and creating a raging torrent This trickle and roar cycle went on for a bit with the remaining members still at the bottom taking cover until things got back to normal when boredom set in.

Mr Cholmondely surprised us all with his boredom threshold whilst being malevolent and was quite content to play the water game for as long as necessary. So poised at the bottom, my turn next, a cunning plan spring to mind. If I could roughly judge the torrent to trickle ratio I could make it to strategic points on the rock face that may afford some cover and get to the top relatively dry. RIGHT ? WRONG ! For the first downpour I was comfortably hidden behind a crag about 10 foot up. Another couple of similar manoeuvres and I’d be at the top, so off I set to scale the next 10 foot. Now I’m not quite sure what happened next. Did he eventually get bored or was he just lucky ? Either way he suddenly decided to remove all damming material just as I reached the smoothest, least shielding piece of rock face. It felt as if I was bathing in the Niagara Falls in the midst of winter, though my companions still at the bottom stated that my constant stream of abuse gave indication that all was well.

We all eventually made it up the pitch (Some wetter than others) and towards the surface via the Short Drop section of Gavel. The Pitch just described eventually goes all the way to the surface, but a more devious route had been rigged by the other party. From the top of the bottom pitch

⇨

a short climb into the roof space leads to a flat out section along a narrow ledge, with the left hand side being open and above the bottom pitch. The flat out section ends suddenly - peering over the edge of a slippery slope which can be seen leading down from right to left to the pitch head. As I was leading this particular part of the trip, I tried what was generally thought to be the easiest method by backing up a touch, turning round and dangling one's feet over the edge to find a foot hold that I had seen before. This proved OK and a quick rock clinging traverse brought me to the top of the slope and to relative safety. I should also mention at this point that I found that my tackle sack wasn't actually attached to my person and had merrily taken a trip down the slope towards the pitch only to catch on a stone 2 foot from its edge. With all members successfully navigating the slope, it was a quick ascent to the top (after a short abseil to retrieve tackle bags) and out into the world. Gavel Pot is at the bottom of a deep shake hole and the previous day's snow and mud made a tricky clamber out - unless like myself you to adopt the four wheel drive hands and knees method.

Regrouping on the fell we then set off for Big Meanie to be met by a slightly fraught Mandy who had dislodged a good hedgehog sized rock while trying to peep down the main shaft. This had been met by squeals of displeasure by a half descended Richard. The layout of Big Meanie is basically just a shaft with a very small shroud of rock at the top so you can't actually see down the shaft unless your in it. Hence, Richard's exclamation and then silence was interpreted by Mandy as being Richard's final words and that his mortal coil was presently being shuffled off as she spoke. We were relieved as Richard appeared from the orifice relatively unharmed except for a bruised shoulder. After the normal “Better luck next time Mandy!” and “How did you miss his mouth ?” etc. etc. we got on to asking about the pot i.e. “What's it like baby?” to which he replied “It's a bit tight at the top”. Now for Robin and myself who have known Richard for many a year, the suspicion is that for him to say “it's a bit tight”, then the trip probably resembles having parts of your anatomy gripped firmly in an engineers vice and being pulled through a letter box while singing bars from ‘Rule Britannia’. So with out further ado I headed In the other direction towards Death's Head.

- Unlike Mr Brian who thought that it sounded even more appealing and undeterred made his way to the pitch head with Robin in toe to record the event. Upon reaching Death's Head we found that there was quite a gaggle of people - some already down the shaft and others waiting to go down to various rebelays. Given the number of clients that the pot was servicing, I wagered that it was going to be a long time before I had a chance of descent. By now the day was waning and the weather was closing. Our wait on the bleak moorland was momentarily interrupted with the arrival of a sober looking Mr Brian who had got wedged in at the top of the pitch (by his head some people say) and deciding better of it. (Ed. Brian's efforts had been quite amusing and were accompanied by muffled grunts and other strange sounds)

We had been waiting for nigh on 30 minutes by this time and the winter weather had relentlessly nibbled away at our enthusiasm finally sending Robert in the direction of the vehicles and dry clothes. He was shortly followed by Robin, then myself. In order to redeem himself, Brian stuck it out and was rewarded by a descent and an ascent made interesting by an iced up karabiner. By the time the stragglers or de -riggers had finished, it was pitch black and the occasional flash from a head lamp out of the car window (whilst eating Mars bars and swigging cans of Fosters) was needed to guide them safely across the moorland. It was suggested that perhaps driving the cars to various other locations on the fell and giving them a flash might prove a bit more entertaining. After considering the disastrous effects that this could have on the remaining drinking time this idea was shelved.

Evening saw us all installed in the Marton Arms for a snack and pint of something strange. Some of it was indeed strange as ordering a pint of a particularly black looking substance brought people out from the kitchens to witness the event. This was to be the booby prize for getting a question wrong in the impending fixed game of Trivial Pursuit. When I say a ‘fixed game’ - I'm not implying that the club's constitution states that we must have one. Oh no! It was merely that others seemed to be asked “How heavy is a four ton lorry ?” and I got asked “What was the name of the Duke of Wellingtons aunt's sister's friend's dog ?” - ‘Oh’ and

⇨

it had to be spelt correctly as well! Brian was well on his way to a victory with various coloured sausages in his ‘cheese’ holder when time dictated that it was time to move on. Besides I appeared to have drunk all the dubious liquid.

We taxied back to the Craven Heifer for a last pint before we said our farewells as Robert and Brian headed back to the campsite and Robin and myself headed upstairs for a well earned rest. At approximately 01:30 after many heated games of Dominoes we did actually say farewell to our companions though our night was far from over After a rather worrying trip to the toilets where a rather portly gent commented on the niceness of my bits and bobs, it came to our attention that things where not quite as they should be. The manifestation of the disturbance was an apparently drunken fellow - a friend or so it would seem from some distant childhood of the landlady who persisted in making comments about the goings on in a certain stable. These comments seemed to get her goat, resulting in a full frontal attack on the said gent thus rendering him incapacitated on the floor - being interrogated by the now in full flow landlady who was perched on his chest.

Using methods extracted straight from some secret police handbook the landlady effectively played the parts of *Mr Nasty* and *Mr Nice* -asking questions in a soothing manner only to scream and rearrange his features when the answer was not to her liking.

With thank to Viz’s *thirsty family man*.

This most unexpected entertainment kept Robin and myself intrigued for another four or five pints until about 03:30 when it fizzled out (or rather he did) and we were forced to retire for the remainder of the night

As expected the Sunday morning 09:00 breakfast eerily turned out to be sometime after 11:00 with Brian predictably turning up shortly afterwards to share in our breakfast comestibles. Note: This breakfast was unanimously agreed to be the best yet experienced on a pothole trip.

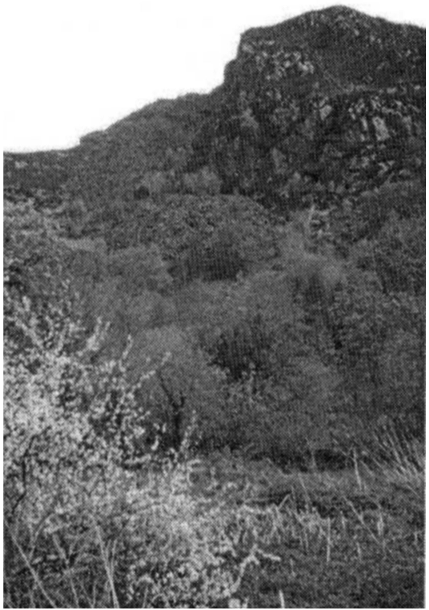
It was agreed that Marble Steps near Ireby Fell was the order of the day with an attempt to get to the bottom via the Sidewinder Route. The 70’ pitch which is an alternative to the usual gully entrance commences with an exposed traverse to a ledge, then a descent via a nice re-belay to a good soaking by the stream which joins the pitch about half way down. Unfortunately, a lack of ironware prevented a descent to the bottom of the pot. Stink Pot and the 90’ were however found to be pre-rigged by the Red Rose who are digging somewhere below the Intestines.

Brian and water interacted again on the way out, but this time in a helpful manner as he was able to pull the abseil rope out of the main water fall to enable us to get up in relatively dry conditions, with himself getting a good soaking following us behind. Ha, Ha... The rest of the trip went without a hiccup and the weekend was brought to a close in Bernies.

Clogwyn y Fuwch Slate Mine

Grid ref. SH759618

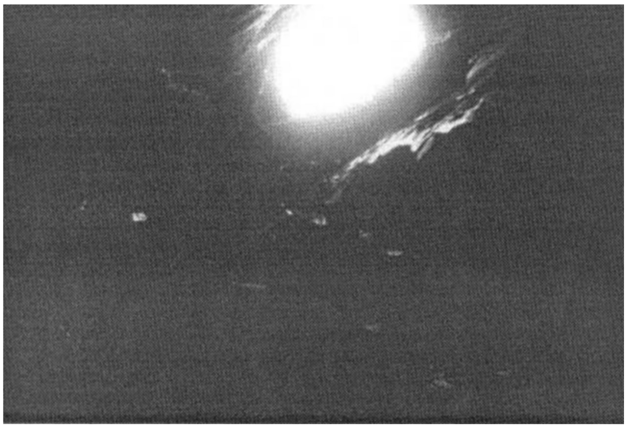
by R.Griffiths



Clogwyn y Fuwch

Prior to my first visit to the Klondyke Lead Mine back in Spring 1996, 1 visited the nearby Clogwyn y Fuwch slate mine. The mine is prominent as a series of cuttings up the hillside on the left before reaching Llyn Crafnant along the Trefriw to Llyn Crafnant road. The workings, although limited in size are significant since they may have served as the model for subsequent underground techniques used in the great Ffestiniog mines. The Lakelander Turner operated the mine for a short time before moving on to manage Diffwys Quarry at Blaenau in 1812 which subsequently developed underground. The poor quality slate is an outcrop of a cleaved, pyritic mudstone vein within the Snowdon Volcanic Group of upper Ordovician age.

The mine was operated on six levels. The lower levels are open chambers, the upper ones developed more fully underground. The bottom level has a ‘cut and cover’ entrance which is a slate built, covered passage used for providing protection against the rockface above. Level 2 is quite shallow. Level 3 at the head of the ruined incline is an open adit leading to two small chambers with roofing tunnels driven up on the left to the next level about 80’ above. The impressive upper levels now take the form of a single large underground chamber with the previously mentioned shafts coming in on the right. There is a good view of the nearby Klondyke Mill from the site.



Looking upwards from the large 4th level chamber

The remains of a mined incline and associated buildings are also discernable.

St Tudwal’s Peninsula Mines - Lleyn

by R.Griffiths

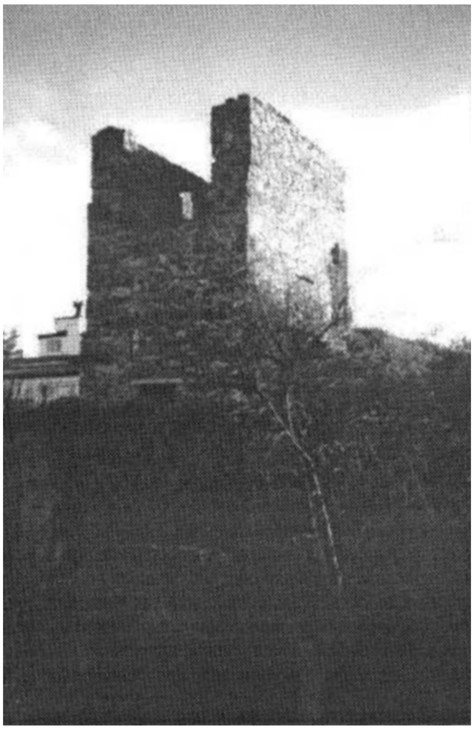
Penrhyn Du

The lead mines were visited by myself just before Christmas 1996. **Penrhyn Du Lead Mine** SH315263 is just to the south of Abersoch on top of the cliffs. The mine commenced operations in the seventeenth century and plans were made in 1782 to install a ‘fire engine’. The Cornish Engine House in a private garden at SH323263 is a later structure. The nearby row of cottages named Cornish Row indicates that not only the engine but also the miners came from Cornwall. To the south of the engine house is an area of spoil heaps with two open shafts. One shaft appears to be blocked by timber and fertiliser bags about 20’ down. The other shaft appears to be about 60’ deep and could easily be descended if a 6’ steel pipe was laid across the shaft as a belay. According to *Grosvenor Newsletter 9*, the extensive area of mine tailings to the north are the remains of **Tan-y-Bwlch Mine**. **Bwlch Tocyn Mine** with a collapsed adit lies towards Abersoch. Further to the south around the headland are a series of shallow workings and scratchings.

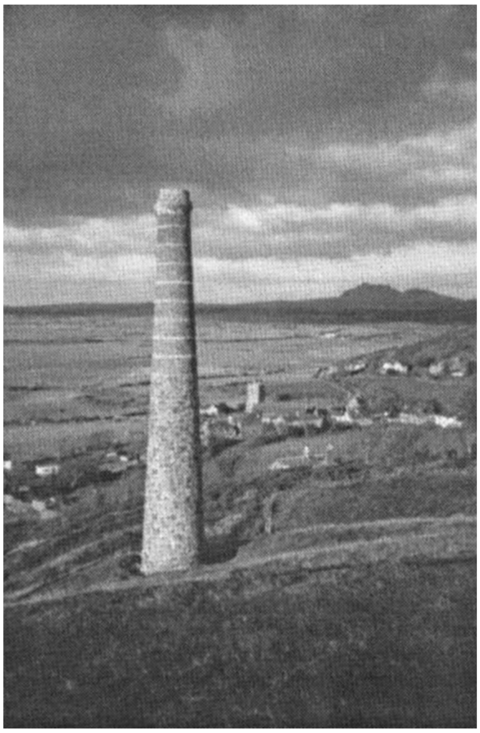
Porth Neigwl

On the west side of the St Tudwal’s headland in the village of Llanengan is **Porth Neigwl Lead Mine** SH295267. The only remains that 1 could find were some tailings near a house and a prominent brick stack on top of the hill. Other lead mines in the area which were not located are

⇨



Cornish Engine House, Penrhyn Du



Brick Stack, Llanengan

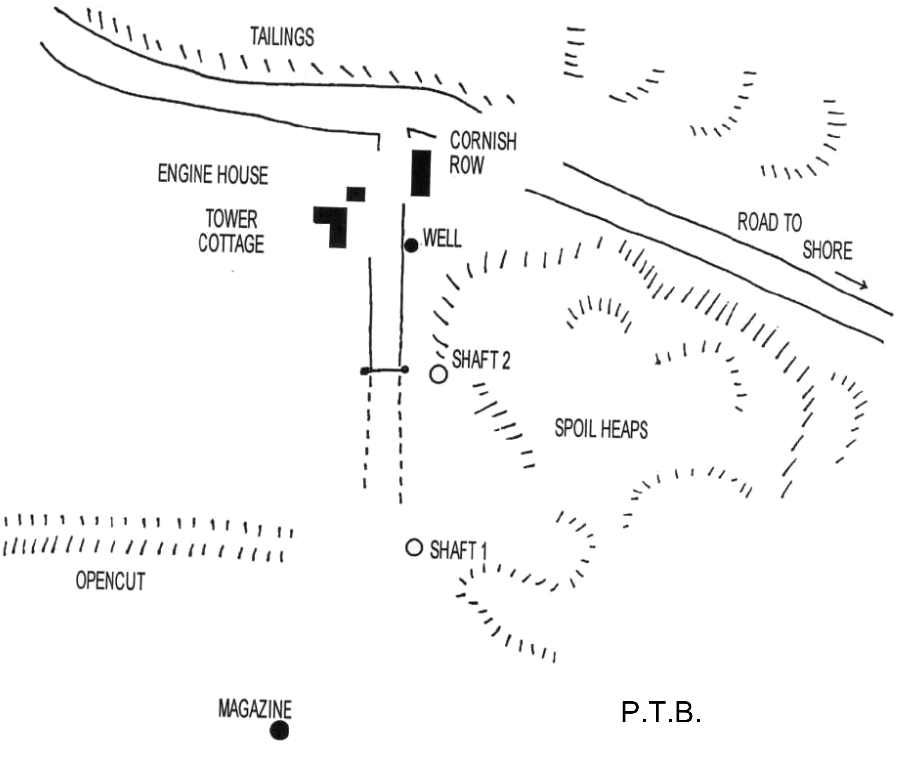
Assheton SH317264 and **West Assheton** SH318263.

Trwyn Cilan Manganese Mine

SH288238 I haven't seen this site documented anywhere but this is undoubtedly what it is. Although in near proximity to the manganese mines of Rhiw they are genetically very different having more in common with the manganese mines of the Harlech Dome. The manganese is found in the Mulfran Shales of lower Cambrian age which are the Lleyn equivalent of the Manganese Shales of the Rhiniogs. The Mulfran shales are a blue to dark series of shales and mudstones rich in manganese which outcrop in a narrow, gently south east dipping series of beds to the west of Mynydd Cilan. To the north are a series of shallow opencast workings. Progressing southwards, downdip, along an old track towards the cliff face are a couple of shallow underground workings. A tricky manoeuvre at the top of a cliff gains access to a flooded shaft and two small adits.

PENRHYN DU LEAD MINE

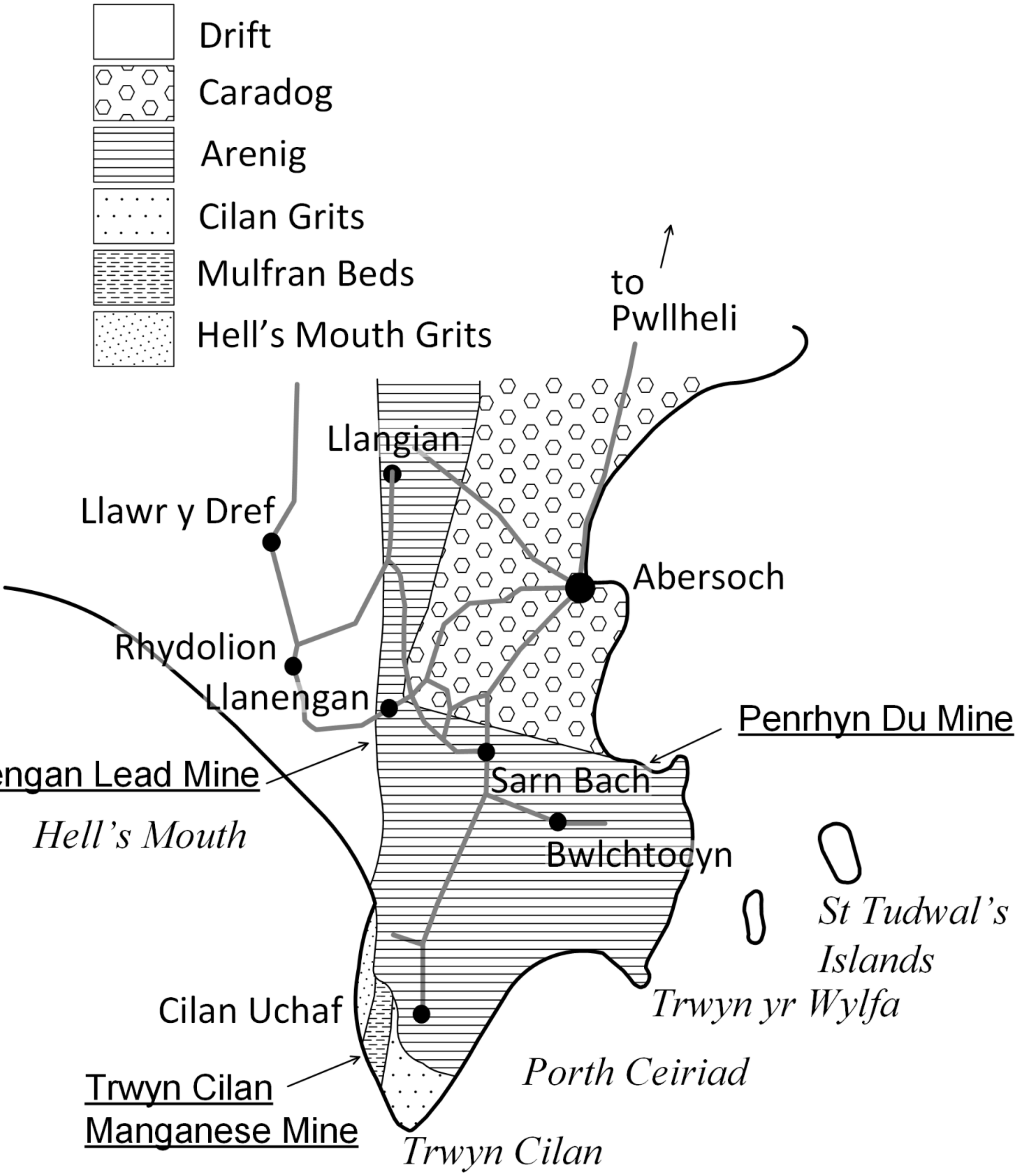
Based on sketch map in Grosvenor CC Newsletter



P.T.B.

Mines around St. Tudwal's Head, Lleyn Peninsula

Drawn R. Griffiths, 1997



Slate Formation - a tectonic view

by Robin Griffiths

Introduction

Remember the old TV series of the early 80's called James Burke's Connections, where obscure events were traced via a number of obscure links to a final goal? Well the formation of slate follows an equally convoluted path in a similar vein (*vein* geddit !!). The thermodynamic machine known as *The Earth* produces the rock known as slate through the interaction of a number of geophysical and geochemical mechanisms. A hopefully concise account (not !!) will be attempted in this article.[†1] Basically this is a brief description of the Theory of Plate Tectonics which many people will have heard of as *Continental Drift*.

The Earth's Structure

The earth's surface consists of two distinct types of crust 'floating' on a denser mantle. Oceanic crust consists of dark, basic basaltic rocks rich in iron and magnesium. The adjective basic is used in this context because basalts are relatively depleted in silica compared to granitic rocks which are acidic. (Acidic does not mean that the rocks are acidic - the term being a hangover from days when rocks were though to be salts consisting of differing proportions of basic metal oxides and acidic SiO_2). Lighter coloured continental crust is more granitic in composition, containing less iron and magnesium, but more aluminium and silica than oceanic crust. On average, continental crust has the same composition as a rock called granodiorite which is intermediate in composition between granite and basalt.

For the purpose of this discussion, the important differences between the two type of crust are their density and thickness. Oceanic crust is denser and thinner than continental crust (7km for oceanic crust, 35km average for continental crust - this figure being quite variable, dramatically so under mountain ranges when it exceeds 100km).

Both oceanic and continental crust are physically strongly coupled to the underlying mantle. At a depth of about 80km, the mantle is partially molten and deforms plastically. This weak zone is known as the asthenosphere. The portion of crust and mantle above this zone - known together as the lithosphere is able to move as a distinct unit in relation to the underlying mantle. This is the basis of the Theory of Plate Tectonics. In this theory, the earth's surface is split into a number of discrete plates which are quite stable at their interiors, but have distinct boundaries. The boundaries are geologically active zones, with earthquakes, volcanoes and deformed rocks. Over time, the plates can change their configuration on the earth's surface. Plates can move, be created and be destroyed.

THE MAJOR BITS OF THE EARTH

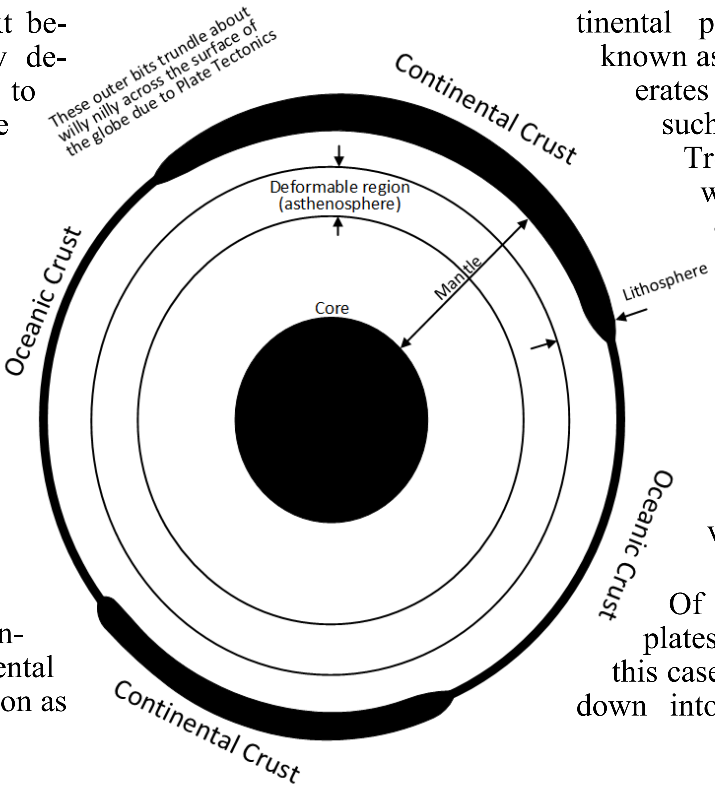

These outer bits trundle about willy nilly across the surface of the globe due to Plate Tectonics
Continental Crust
Oceanic Crust
Deformable region (asthenosphere)
Mantle
Core
Lithosphere
Oceanic Crust
Continental Crust

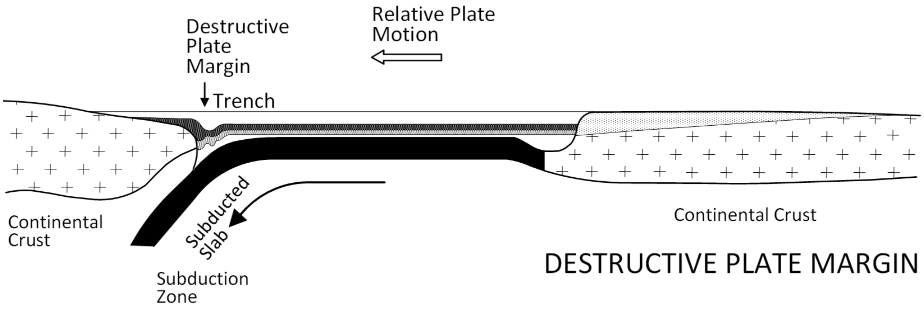
Plate Margins

a) Destructive or Convergent Plate Margins

Oceanic lithosphere is destroyed at destructive plate margins. If two oceanic plates collide, then one plate will be forced under the other and down deep into the earth's interior. Also, if an oceanic plate collides with a continental plate, the oceanic plate because of its higher density will be forced down underneath the continental plate. This process - known as subduction often generates a deep ocean trench such as the Marianas Trench off East Asia when the ocean floor is dragged downwards. The descending slab is heated by friction and this heat together with dehydration within the slab causes molten magma to form which rises to the surface forming volcanoes.

Of course two continental plates can also collide. In this case neither plate is forced down into the earth because

⇨



DESTRUCTIVE PLATE MARGIN

of their density. Instead the crust thickens and a great mountain chain is formed. This is what happened when the Indian continental plate collided with Asia forming the Himalayas.

Contemporary examples of plate collisions are:-

- Ocean - Ocean collision. North west Pacific. The Pacific oceanic plate is being subducted underneath the oceanic Philippines plate giving rise to the volcanic Philippine archipelago.

- Ocean - Continent collision. The Nazca plate of the eastern pacific is being subducted beneath South America. This has given rise to the volcanic Andes mountain chain.

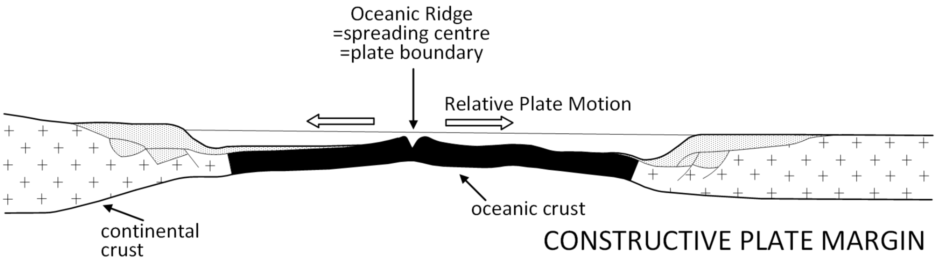
- Continent - Continent collision.
  The Himalayas and the Alps are still being uplifted as India and Africa continue to move northwards. An ocean - continent collision may ultimately transform into a continent-continent collision if the oceanic plate has continental lithosphere connected to it.

All these collision events cause earthquakes, volcanoes and deformation of rocks. Compressive forces cause the crust to be thickened, faulted and folded.

b) Constructive or Divergent (Spreading) Plate Margins

Oceanic lithosphere is being continually generated at oceanic ridges which are also plate margins. This type of plate margin is called a constructive margin, since new oceanic crust is generated as hot basaltic magma rises from deep magma chambers. The oceanic crust on either side of the margin spread away from each other with the ocean growing as a consequence. The Mid Atlantic ridge is a typical example.

Continents can also give birth to new oceanic lithosphere by splitting. Continental lithosphere initially thins, then rifts with basaltic lavas being extruded. This process may be going on nowadays in the East African rift valleys which together with the Red Sea may be an embryonic ocean of the future. The North Sea basin is believed to be the site of a proto ocean that failed to progress further than the initial crustal thinning and rifting stage.



CONSTRUCTIVE PLATE MARGIN

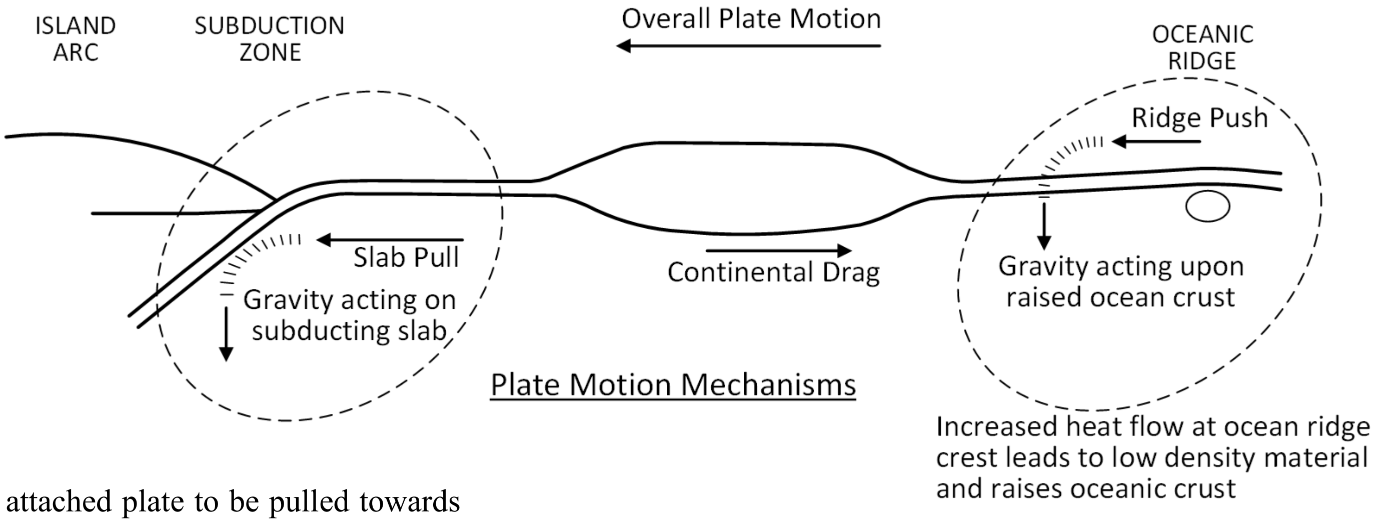
c) Conservative Plate Margins or Transform Faults

There is a third type of plate margin. This occurs where plates are neither moving towards or away from each other, but are moving sideways in relation to each other. In this case, crust is neither created or destroyed but is conserved. A modern day example is the San Andreas fault system of California. Western California which is part of the Pacific plate is moving northwards relative to North America. In a few million years, Los Angeles will be a suburb of San Francisco - later it will be rafted off as an island into the Pacific Ocean. These types of margins are also known as *Transform* boundaries because the spherical geometry of the earth's surface means that a conservative margin can transform into a destructive margin as one traverses the plate boundary along an intervening Transform Fault.

Plate Tectonic Mechanisms

The end result of Plate Tectonics is that oceans can form and be destroyed. Continents can move over the globe, sometimes colliding, sometime being split again. But what system of propulsion cause the plates to move across the globe? The key is the earth's internal heat generation system and the relatively dense nature of oceanic crust. Moving further away from a constructive margin, the age of the oceanic crust gets older. The crust also becomes cooler and hence denser away from the margin. Eventually the dense oceanic crust sinks into the mantle creating a new destructive margin. It is believed that the force of gravity pulling down the dense slab is enough to cause the

⇨


ISLAND ARC
SUBDUCTION ZONE
Overall Plate Motion
OCEANIC RIDGE
Ridge Push
Slab Pull
Gravity acting on subducting slab
Continental Drag
Gravity acting upon raised ocean crust
Plate Motion Mechanisms
Increased heat flow at ocean ridge crest leads to low density material and raises oceanic crust

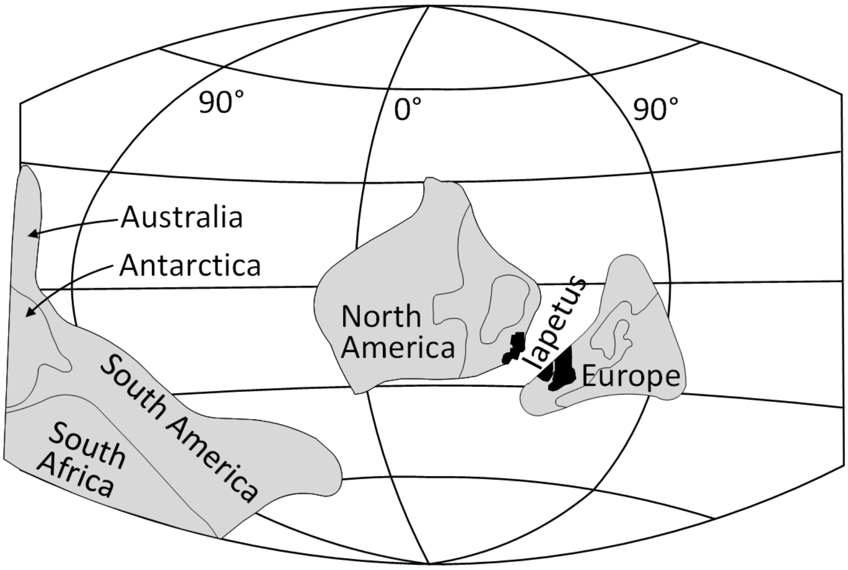
attached plate to be pulled towards the destructive margin. This mechanism is known as the slab pull effect.

Another mechanism that contributes towards plate motion is ridge push. Constructive margins are underlain by hot, low density magma chambers. The low density at such margins cause lifting of the crust through a process called isostatic adjustment. This is why such margins are areas of high relief e.g. Mid Atlantic ridge. It is thought that this increase in relief is enough to cause the plates to slip sideways under gravity away from the ridge.

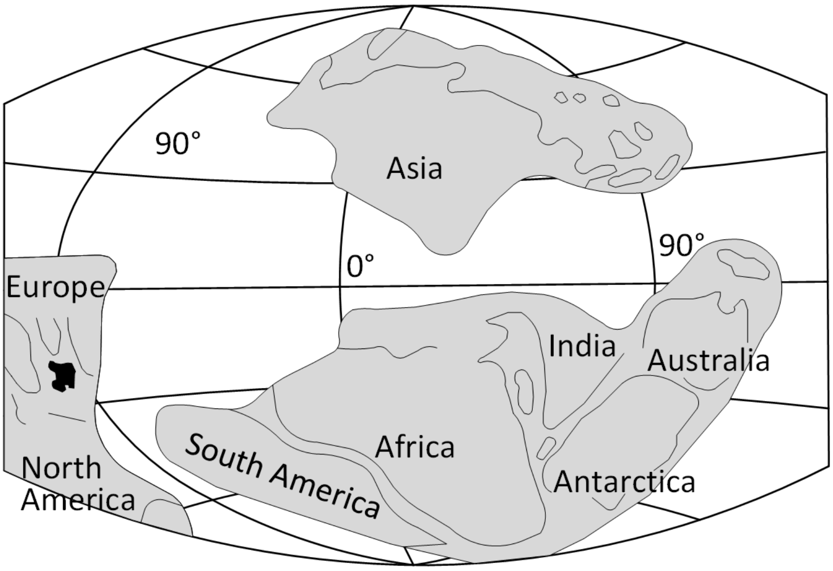
Whatever the dominant propulsion system, it is clear that ultimately the plates are driven by the convective motion of the earth’s hot mantle.

Tectonic Cycles

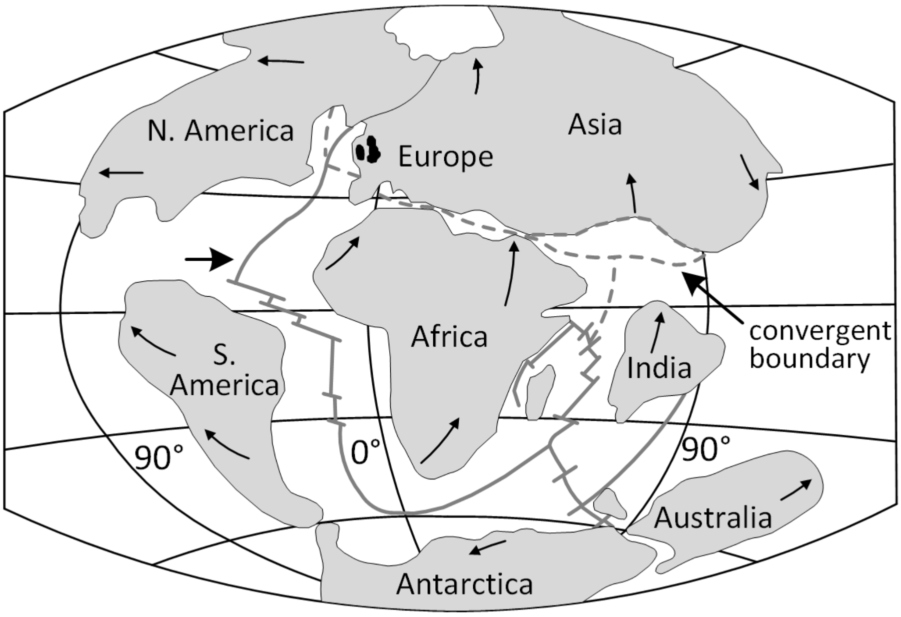
Today, the Atlantic ocean is spreading. There are reasons to believe that the process of continental rifting, oceanic spreading, ocean closure and continental collision is a cyclic one. The Atlantic ocean is about 65 Ma old. Prior to this time Europe and North America were connected and formed part of the supercontinent of Pangaea (all earth). Prior to Devonian times Europe and North America were separate again with the Iapetus Ocean occupying a similar position to the current Atlantic Ocean. However ⇨



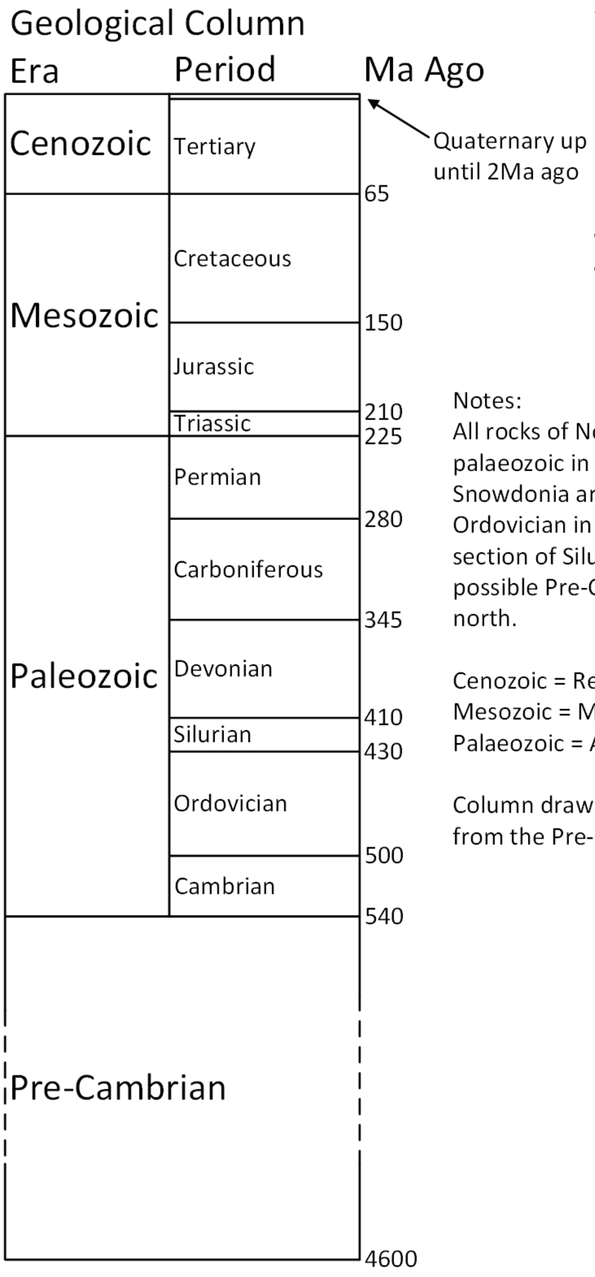
THE CAMBRIAN PERIOD: 500 million years ago. Iapetus Ocean separates Britain from Scotland. Iapetus is shrinking.



THE DEVONIAN PERIOD: 380 million years ago. North America and Europe have collided giving rise to the Caledonian Mountains.



Start of the TERTIARY PERIOD 65 million years ago. A new spreading ridge system develops along a similar line to Iapetus forming the Atlantic Ocean.



Geological Column

Era	Period	Ma Ago
Cenozoic	Tertiary	65
Mesozoic	Cretaceous	150
	Jurassic	210
	Triassic	225
Paleozoic	Permian	280
	Carboniferous	345
	Devonian	410
	Silurian	430
	Ordovician	500
	Cambrian	540
Pre-Cambrian		4600

Quaternary up until 2Ma ago

Notes:
All rocks of North West Wales palaeozoic in age. All rocks of Snowdonia are Cambrian or Ordovician in age apart from small section of Silurian to the east and possible Pre-Cambrian tuffs to the north.

Cenozoic = Recent Life
Mesozoic = Middle Life
Palaeozoic = Ancient Life

Column drawn to scale apart from the Pre-Cambrian

at this time Scotland and Northern Ireland lay on the opposite American side of the ocean to the remainder of Britain.

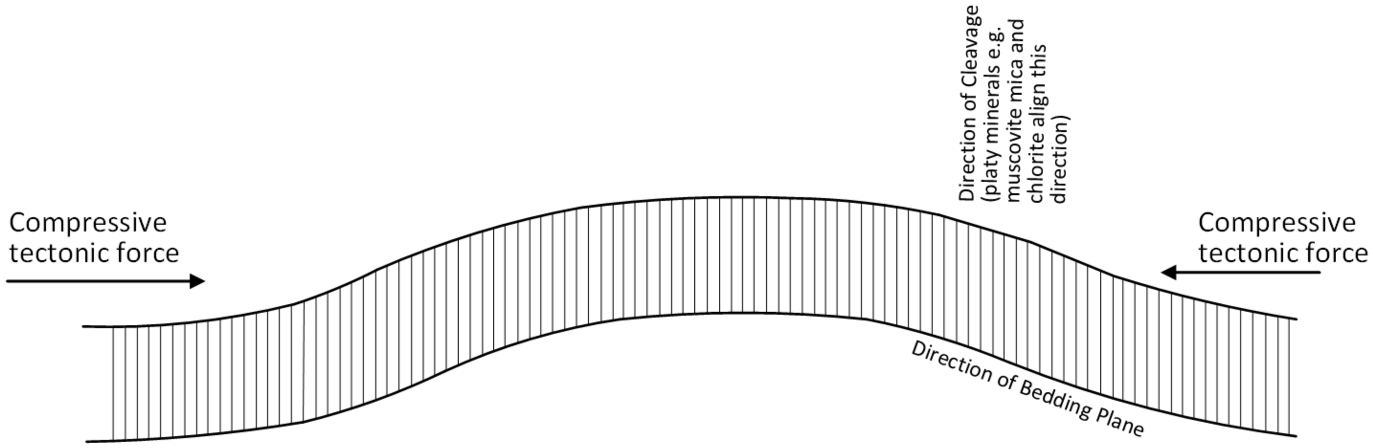
Potted Geological History of North Wales

During Cambrian and Ordovician times, much of North Wales occupied a subsiding basin to the south of a northern land mass. Varying deposition conditions led to the deposition of a range of rocks. Fine grained silts and mudstones were deposited during deep water times. Coarser sandstones and grits were deposited during shallower phases or when instability of the northern continental slopes caused coarser material to be swept south as dense turbidity currents. During the Ordovician, the Iapetus Ocean which lay to the north was shrinking and there was a destructive plate margin somewhere in the vicinity of the current day Solway Firth. Volcanism related to this margin generated a suite of volcanic rocks in both Snowdonia and the Lake District. Volcanism subsided towards the Silurian, but the Iapetus Ocean continued to shrink.

Eventually during late Silurian/early Devonian times, North America (including Scotland) collided with Europe from the north west. This compressive event led to the formation of a series of fold mountains called the Caledonides (after Scotland), which can today be traced across Scandinavia, northern Britain and Nova Scotia. Because the direction of collision was north west to south east, Caledonian structures - mountains, folds, faults & cleavage follow a line perpendicular to this direction i.e. south west to north east. This is the characteristic ‘grain’ of Britain which can be seen plainly on any British Map - physical or geological. A handy bit of info if lost in the hills without a compass is that most northern British structures (folds and cleavage) trend from South West to North East.

For the rocks caught in the middle of this maelstrom of tectonic activity, it is bad news! Coarse grained rocks such as sandstone and some

⇨


Direction of Cleavage (platy minerals e.g. muscovite mica and chlorite align this direction)
Compressive tectonic force
Compressive tectonic force
Direction of Bedding Plane

This is a gross simplification. The actual geometry can be pretty involved.

Development of cleavage fabric in suitable mudstones

volcanic unit may be simply folded and cracked along joints. However for the mudstones (Did I mention those being deposited in North Gwynedd during the Cambrian and those in Ffestiniog during the Ordovician ?), it's a bit more interesting.

Formation of Cleavage

When rocks are compressed, a number of things can happen depending on the characteristics of the compressive force and the composition of the rocks. To a large extent mudstones consist of fine clay and quartz particles. When subjected to an uniform stress in one direction some degree of metamorphism takes place. Existing minerals tend to align themselves so that their long axes are perpendicular to the applied force. Not only this, but new minerals can grow at the expense of others. Platy muscovite (a mica) and chlorite crystals can form from the clay minerals in the rock and take up an alignment perpendicular to the applied force. Where the alignment of these secondary minerals is favourable for the rock to spilt along these planes, the rock is said to have a cleavage. Such is a case with slate. It is important to realise that the direction of cleavage is independent of the original bedding plane of the rock.

The metamorphism associated with slate is classified as low grade, regional metamorphism. Low grade because there isn't that much change to the original rock apart from the cleavage, and regional because it occurs over a large area!

The distinction between cleavage plane and bedding plane is particularly important with slate because its the cleavage which give the slate it's splitting property. Any interference from the bedding plane is most unwelcome.

Conclusion

Consequently, slate is any mud rock which has been affected by low grade metamorphism which shows a cleavage that allows it to be split satisfactorily. This is a function of the original sedimentary deposition conditions followed by a compressive tectonic event (Caledonian in this case).

There have in fact been other mountain building events (or *orogenies* - ooh eh missus!) in the earth's history. The Caledonian was followed by the Varsican (or Hercynian) Orogeny during the early Carboniferous which mainly affected Devon and Cornwall & South Wales. Much of Britain's mineral wealth is associated with this event when mineral rich fluids were later injected into faults caused by the deformation.

Then again them is the Alpine Orogeny (about 100 Ma ago when Africa collided with Italy) which is still happening - the Alps are getting higher by a few centimetres each year, although erosion does its best to catch up! It is likely that some tens of millions of years into the future that the Atlantic Ocean will start to contract again with a new continental collision leading to the creation of a new mountain chain.

Software Notes

This article documents the various software used to produce *Ogofa*. In the good old days *Ogofa 1* was produced entirely using Word for Windows V2. It took a few days. Nowadays, DTP is used to combine data from a variety of sources over a period of a few months ! (Ah, such is progress !!!)

Page Plus 95. Used for DTP. Text and graphics from various sources are used to create document pages. A basic 3 frame template is used for most pages which contains a page header and footer. Pages are numbered upon completion of publication layout. All copies of *Ogofa* are printed directly from a laser printer. Average size of publication upon compression using WINZIP was about 5M. However *Ogofa 5* is expected to be about 20M byte after compression (currently 50M uncompressed with about 20% of articles pending). Archive copies arc now stored on DAT tape. As well as digital storage, copies of all *Ogofa* are available from Welsh National Library Aberystwyth and the BCRA Library Matlock.

Word for Windows V6/95 is used for producing all text.

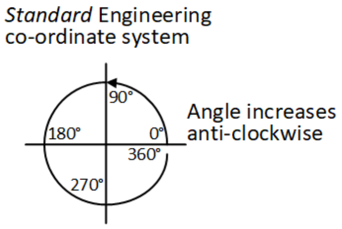
Paint Shop Plus 4 is used for preparing bit map images. They usually need to be cropped and the Brightness & Contrast adjusted before incorporation into a page.

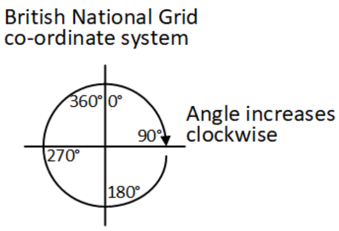
AutoCAD LT 95 is used for the majority of non bitmap graphics. Auto Sketch was originally used, but after the initial steep learning curve, AutoCAD turned out to be more efficient. It is particularly apt for survey data because relative polar data can be inputted directly (which is what is recorded in the field) using the

`@[distance]<[angle]`

notation. The only big problem with this piece of software that I have found is producing solid fills for arbitrary shapes which aren't circles, triangles or rectangles.

Coral Draw 4. This vector drawing passage is used mainly for annotating bitmap images so that text quality is maintained at different viewing scales. Corel Trace is used for converting bitmaps to vector format drawings to serve as base maps for some surveys.



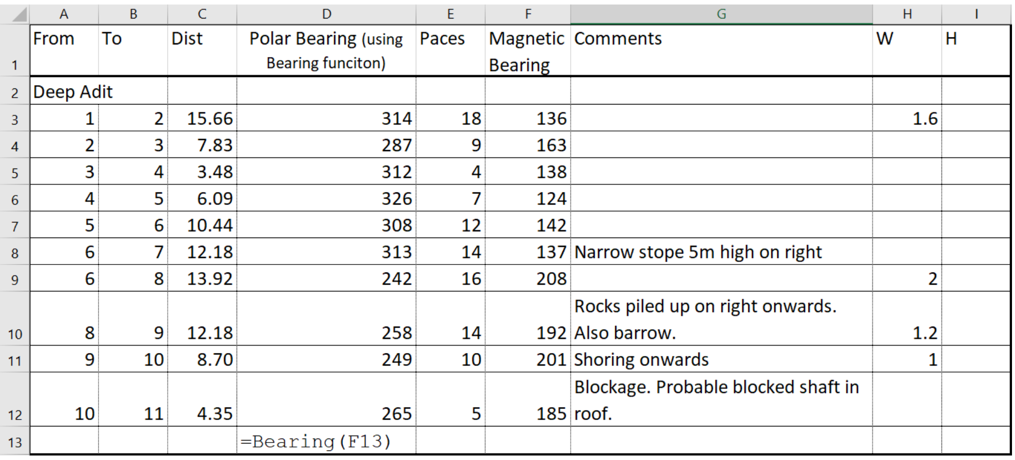


Winzip 95. This is used for compressing issues of *Ogofa*.

Excel 7. This is used for processing survey data prior to plotting using AutoCAD. A nice little function (annotated below) is used to convert national grid bearings to standard engineering angles. National grid angles start with 0° at north and increase clockwise whereas standard engineering bearings start with 0° at east and increase anti-clockwise. Survey data is immediately typed into Excel and a centre line produced whilst the memory is fresh so that errors can be identified and rectified. An example survey spreadsheet (for Pant-y-warch) is reproduced below.

Excel Function for converting National Grid (magnetic actually!) angle to standard Engineering Bearing

```
Function Bearing(Angle)
   Bearing = (360- Angle +
   90) Mod 360
End Function
```



	A	B	C	D	E	F	G	H	I
1	From	To	Dist	Polar Bearing (using Bearing funciton)	Paces	Magnetic Bearing	Comments	W	H
2	Deep Adit								
3	1	2	15.66	314	18	136		1.6	
4	2	3	7.83	287	9	163			
5	3	4	3.48	312	4	138			
6	4	5	6.09	326	7	124			
7	5	6	10.44	308	12	142			
8	6	7	12.18	313	14	137	Narrow stope 5m high on right		
9	6	8	13.92	242	16	208		2	
10	8	9	12.18	258	14	192	Rocks piled up on right onwards. Also barrow.	1.2	
11	9	10	8.70	249	10	201	Shoring onwards	1	
12	10	11	4.35	265	5	185	Blockage. Probable blocked shaft in roof.		
13				=Bearing(F13)					

Access 7. This is used for the mailing list.

Prince of Persia 2. This was used for some light relief whilst producing this publication.

Llanailhaiarn Manganese Mine

by Robin Griffiths

Looking west towards the mine. The Eifl in the background

Grid Ref. SH407461

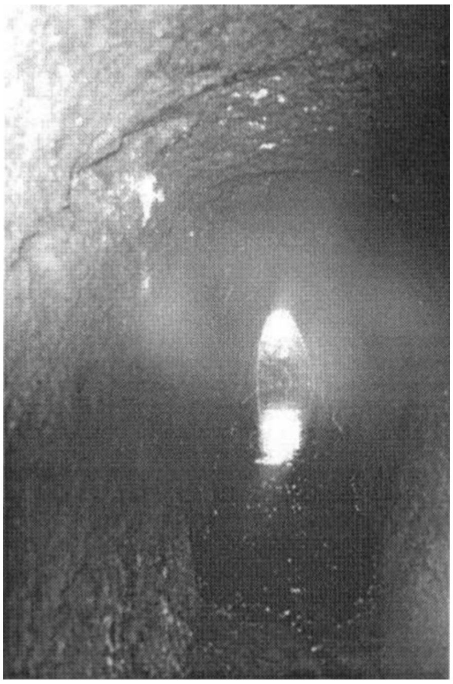
These are to be found on the south eastern slope of Gurn Ddu above Llanailhaiarn. They are reached by taking the minor road up from the pub and then walking up the valley to the east. Remains of the workings are quite extensive. There are about a dozen small spoil heaps and pits - the remains of collapsed adits. However only three shallow adits remain open. The mines operated between 1872 and 1876 during which 50 tons of ore was produced.

The manganese bearing rock dips at about 40° towards 280° (west) and is moderately cleaved. Given the dip of the vein, the three adits explored must lie within different veins. Adits are not numbered in any particular order.

Adit 1 split into two immediately at the entrance. The left branch descends steeply into a pool of indeterminate depth. The right branch which is about 4’ square continues for about 45’ to its termination.

Adit 2 was about 4’ wide, 6’ high and extended about 50’. There was a small side passage to the right near the entrance.

Adit 3 was about 4’ wide and high with an arched roof. After about 30’ the passage becomes wider and lower as it curves to the left. A low crawl through what looks like a mud duck might continue.

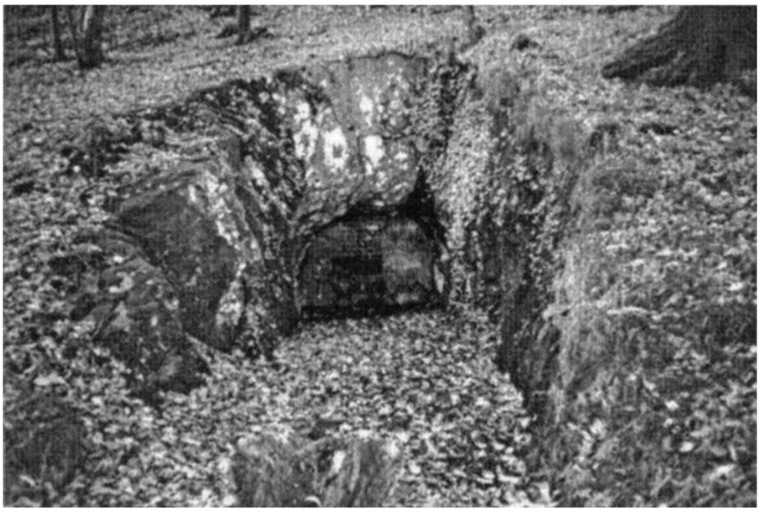


Adit 3 showing arched roof

Adit 1 entrance

Llanfrothen Adit

Below is a photo of Llanfrothen Adit (name unknown) that was discussed in *Ogofa 4*. Entrance is bricked up but access is gained by squeezing through a hole.



Some more Llandudno Caves

by Robin Griffiths

Oqof Pant y Wennol

Grid Ref. SH80828161

This is situated in the limestone hill called Mynydd Pant adjacent to and continuous to the Little Orme ridge. It is approached by taking the road 100m uphill from Bodafon School. Just below a white cottage an overgrown path doubles back for about 30m to a ruined cottage - Pant y Wennol Cottage. The cave is immediately behind the cottage below an overhang in the cliff.

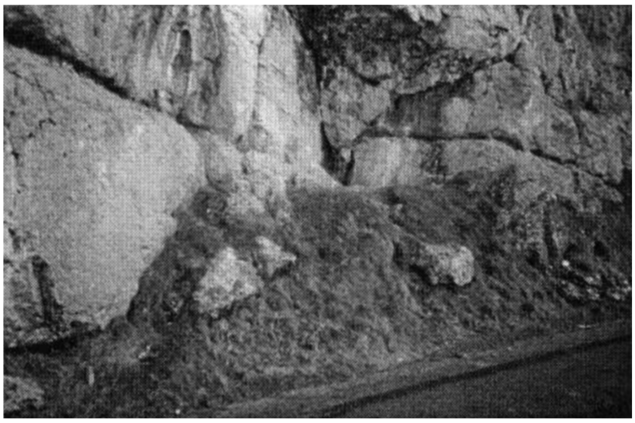
The entrance is about 6m wide and 3m high containing old scaffold pipes and other rubbish. The passage closes down immediately to proportions of about 1.5m x 1.5m. A low crawl on the right closes within 3m. Onwards continues along 2.5m high rift to 4m x 1.5m deep excavation in floor. Rift becomes too tight and choked for progress within another 2m. Total length of passage estimated about 10m. Was site of important archaeological excavations in 1974/1975 by M. Davies & Dr. K. Mason. Mesolithic remains up to about 10,000 years old including scrappers, broken pottery, bone needle and various animal bones have been recovered. The remains of five human skeletons including that of a child have also been recovered.

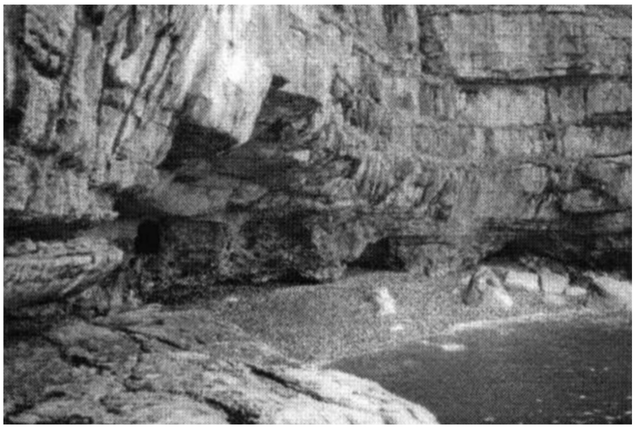
Oqof Tan y Bryn

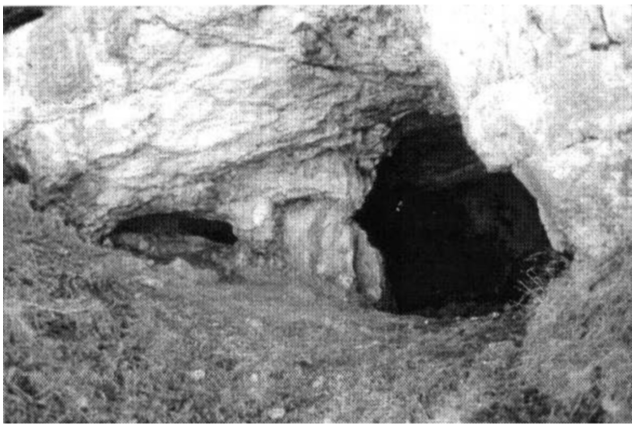
Grid Ref. SH79948160

In grounds of Tan y Bryn Nursing Home, Tan y Bryn Road, Craig y Don. Just above car park in shrubbery. 3m high x 4m wide entrance to passage up to 6m high. Clay floor. Excavations revealed various remains.

Ogof Pant-y-Wennol, Penrhynside


Lloches yr Afr, Great Orme


Ogof Colomen, Great Orme


Ogof Tudno, Great Orme

Reconnoitering - Bits & Bobs

Llanfrothen Area

Catherine and Jane Consols

SH633411. Workings in forest above Ffestiniog Railway near Penrhyndeudraeth.

A steeply inclined square shaft approx. 120’ deep intercepts three levels, bottom blocked and upper unsafe. Middle level with nice flatrods emerges to daylight after constriction. Surface location of deep adit unknown. The extremity of the Bwlch y Plwm adit is not far from the property boundary and there were plans to extend it to drain Catherine and Jane Consols. The workings were explored by myself, Brian and Robert during our early Bwlch y Plwm reconnoitring.

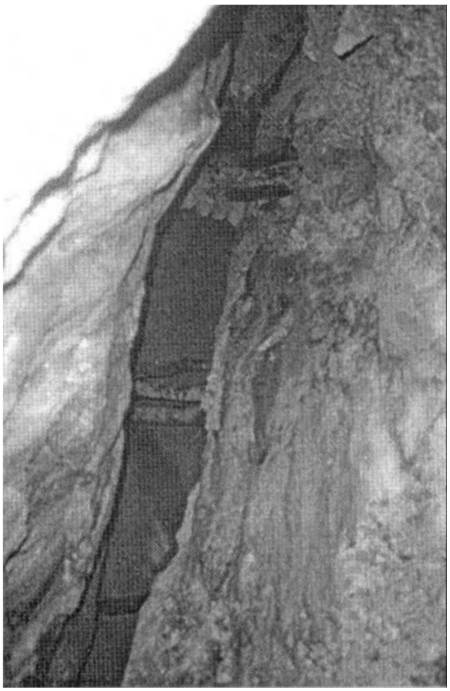
Cae Fali

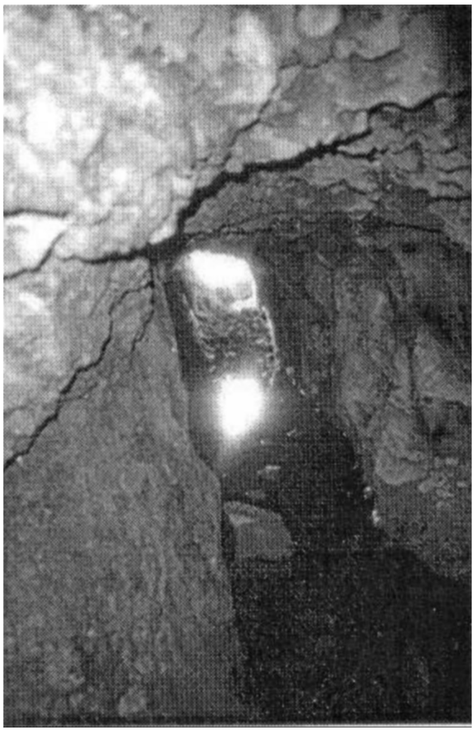
Lower down the valley is an adit draining workings at Cae Fali at **SH631405**. This has not been visited.[†3]

Rhyd Mine

Further to the cast near the village of Rhyd at **SH 637416** near the start of the forestry is another as yet unidentified working marked by spoil and building remains. This was briefly explored by myself but not to its conclusion. An adit from top of spoil heap with vertical stopes underneath. It is probable that a deep adit exists but is obscured by the spoil. There are a number of shallow trial workings and mineralised remains in this area.

Entrance to ‘Rhyd Mine’


Stopes in ‘Rhyd Mines’


Entrance passage in ‘Rhyd Mine’

Beddgelert Area

Brynfelin

SH589472. Just outside Beddgelert approaching Aberglaslyn. Pre 19th C mine. The workings are in the trees and consist of a number of stopes estimated at about 60’ deep. There is also a stone lined shaft on one of the spoil heaps. Nearby is a what appears to be a powder hut. A drainage adit emerges near the Beddgelert road. The mine has not been explored as yet.[†4]

Level Goch

SH593466, Aberglaslyn Pass.

Marked as a spring on the 1:25,000 map. Now blocked. Was long, ancient adit. Red water drains through wall near road.

⇨

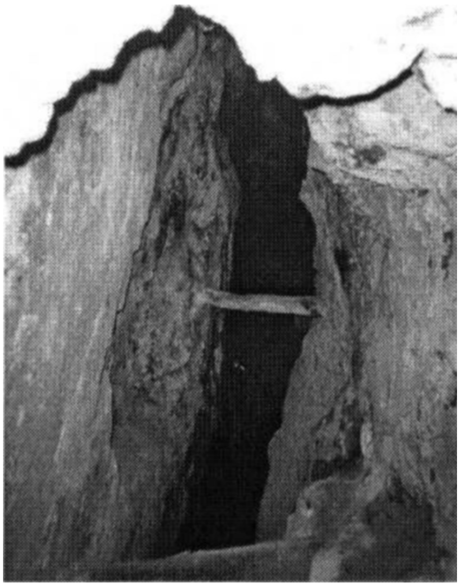
Brynfelin

Some ore cuttings on rough hillside above.

Aberglaslyn Mine

SH594462. In woods behind house near Aberglaslyn bridge. On same vein as Nantmor mines. A deep adit behind the house and a series of workings leading up the hillside. There appear to be three or four levels connected by internal stopes. Towards the top of the hill are open stopes and the remains of a wheel pit. The workings have not yet been explored. Near the road is a short, wet level.

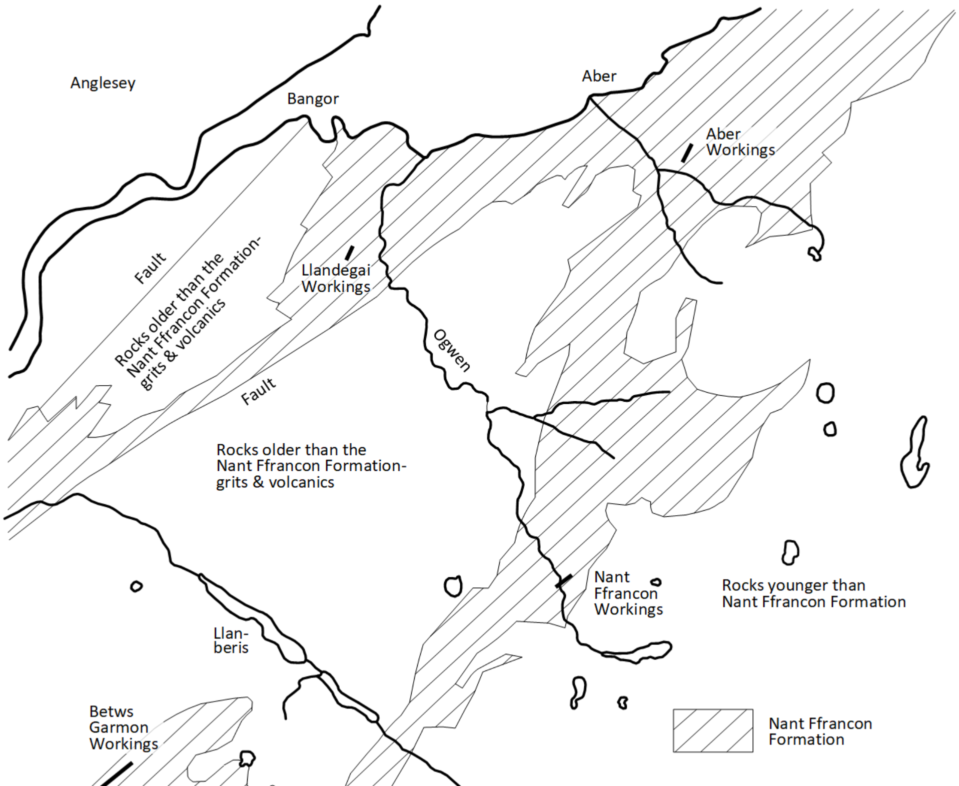
On opposite side of river bank near wooden bridge is approximately 200m long adit at river level.



Stopes at Aberglaslyn

Iron Mining

by Robin Griffiths


Anglesey
Bangor
Aber
Aber Workings
Fault
Rocks older than the Nant Ffrancon Formation- grits & volcanics
Llandegai Workings
Ogwen
Fault
Rocks older than the Nant Ffrancon Formation- grits & volcanics
Nant Ffrancon Workings
Rocks younger than Nant Ffrancon Formation
Llanberis
Betws Garmon Workings
▨ Nant Ffrancon Formation

Map showing distribution of pisolitic iron workings within the Nant Ffrancon Formation

Some iron has been exploited predominantly from within a single rock formation- the Nant Ffrancon formation. This is a cleaved mudstone which crops out on the side of Moel Eilio SH544579 near Betws Gannon where it has been mined from a series of large chambers that follow the steeply south east dipping strata up the hillside. Also seen are the remains of an incline and winding houses. [†5]

There are some workings within the same formation at SH643622 adjacent to the A5 in the Nant Ffrancon Pass. These workings take the form of an opencast with a couple of small levels.

Mines within the same formation have been exploited near Llandegai SH590696, Aber SH670724 and possibly above Cwm Anafon. Ore bodies are also present at Cader Idris, Llanengan, Trefriw, Anglesey and Tremadoc.

Such pisolitic (the nodules look like peas) iron deposits are often associated with manganese. Nant Manganese mine at Rhiw was also known as Nant Iron Mine.

Iron workings on Moel Eilio, Betws Garmon

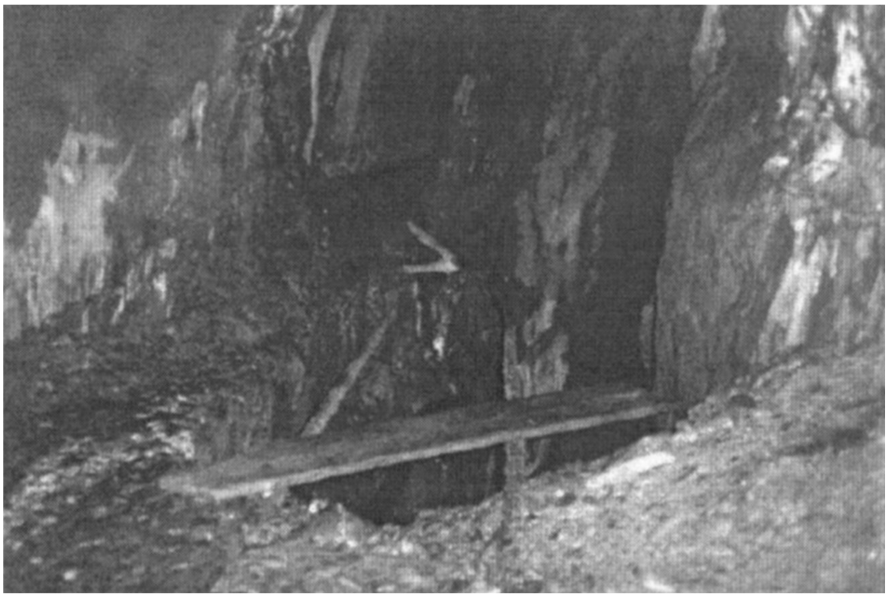
Nant Ffrancon Mine

by Robin Griffiths

These mines are along the bottom section of the minor road on the other side of Nant Ffrancon from the A5. I visited these mines on a frosty afternoon on the 2nd of January 1997 with *The Old Copper Mines of Snowdonia* as a companion.

Cwm Ceunant SH626637

The most prominent mine in Nant Ffrancon. A series of three spoil heaps on the hillside in Cwm Ceunant on the side of Carnedd y Filiast at about 300-350m Asl. Lower down the hillside is the remains of a building, probably associated with the workings.

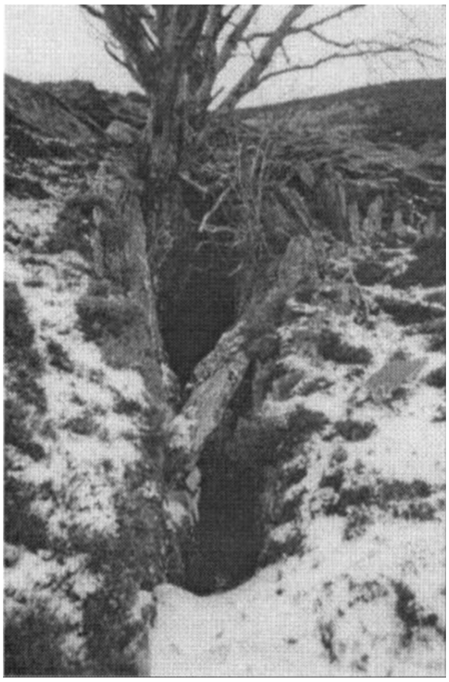


Shaft at Cwm Ceunant

The lowest adit is blocked with spoil from the upper workings. Each adit has a the remains of a little stone hut immediately to the left of their entrances. To the left of the middle adit, a vein of chalcopyrite is visible. The adit passes immediately under a short shaft to the surface, then under a low, short section under a false floor to a stope about 3m wide and 4m high. Here a 20m deep shaft blocks the route onwards. However the remains of a tubular railway traverse the shaft on the right. After some judicious testing by bouncing up and down on the edge of the rail, I managed to gingerly cross the shaft on all fours using a handy handhold on the right. The shaft itself drops into the blocked bottom adit and there are some loose timbers and boulders around the top edge. The entrance side is fairly clear of rubble and a descent is probably possible in relative safety given a suitable belay.

Onwards leads to a collapse, but a low crawl to the left reaches a short continuation. To the left again is a short, parallel section half full of water. A little alcove to the right leads immediately to the bottom of a wet shaft upwards. Crossing the shaft was a bit more tricky on the way out since I had to rely entirely on the wobbly rails.

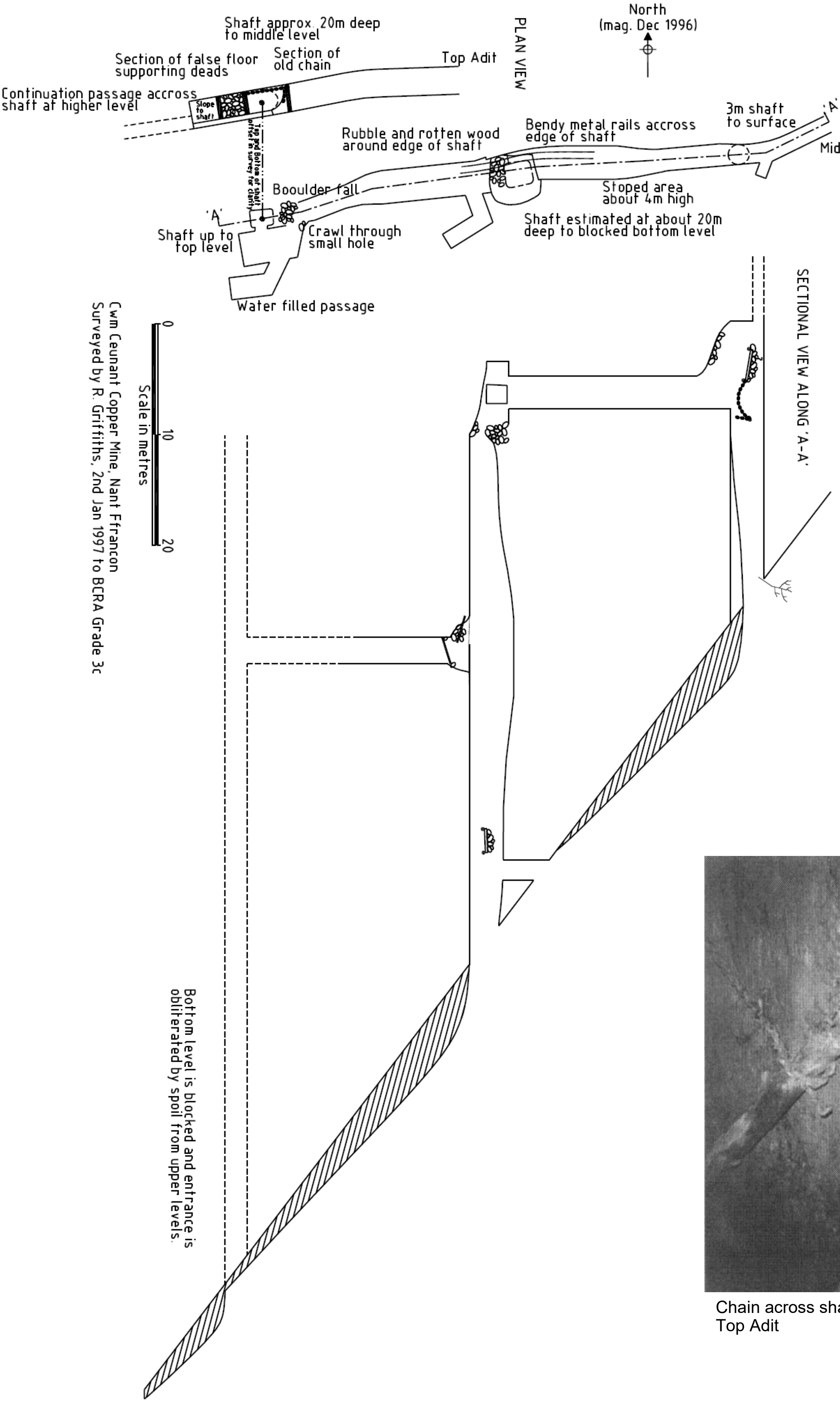
Cwm Ceunant Middle Adit

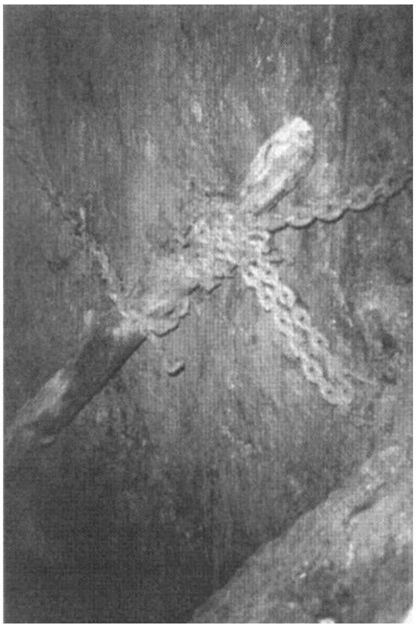


Cwm Ceunant Top Adit

About 20m up the hill is the top adit. This soon reaches the top of the previously visited shaft. The top of the shaft is quite interesting. There are a number of large props and a section of false floor above the shaft. Also of interest was a bulky chain spanning the opposite side of the shaft. At a higher level across the shaft is a smaller continuation passage. Gaining access to this without rope protection would be rather risky and was not attempted.

All in all a very interesting little mine. A return visit to the bottom level and top continuation will be on the cards. Geologically, the vein mineralisation is developed in well cleaved mudstones of the Marchlyn Formation and appear to be related to a series of intruded dolerite dykes and local extensional faulting. ⇨


PLAN VIEW
North
(mag. Dec 1996)
Shaft approx. 20m deep to middle level
Section of false floor supporting deads
Section of old chain
Top Adit
Continuation passage accross shaft at higher level
Slope to shaft
Top and bottom of shaft offset in survey for clarity
Rubble and rotten wood around edge of shaft
Bendy metal rails accross edge of shaft
3m shaft to surface
'A'
Middle Adit
Booulder fall
Stoped area about 4m high
'A'
Shaft estimated at about 20m deep to blocked bottom level
Shaft up to top level
Crawl through small hole
Water filled passage
0
10
20
Scale in metres
Cwm Ceunant Copper Mine, Nant Ffrancon
Surveyed by R. Griffiths, 2nd Jan 1997 to BCRA Grade 3c
SECTIONAL VIEW ALONG 'A-A'
Bottom level is blocked and entrance is obliterated by spoil from upper levels.



Chain across shaft—Cwm Ceunant Top Adit

Gwaith SH632633

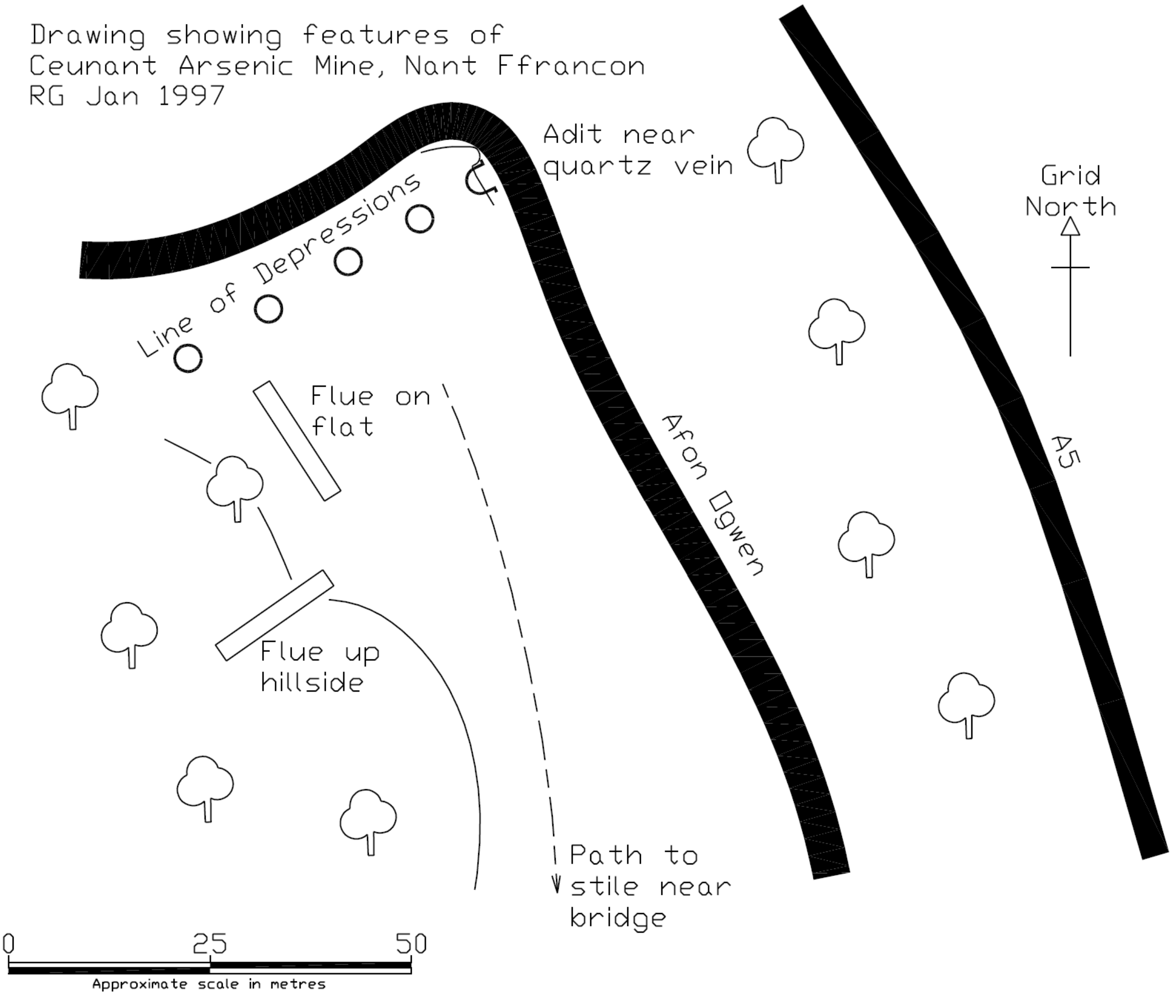
An old copper mine operated during the late 18th to early 19thC. This is further up the valley at the base of Cwm Graianog opposite a ruined building just after Tai Newyddion. There is a blocked adit under the road and an open level above the road. Unfortunately this is full of water and the festering remains of a bloated sheep were bobbing up and down in the entrance. Judging by the amount of spoil outside, the extent of the adit is unlikely to be great.

Ceunant Arsenic Mine SH633645

This is approached by taking a stile along a public footpath at the bridge across the Ogwen River and following a rough path downstream towards a bend in the river. The most obvious remains are two stone built flues used for the sublimation of arsenic. Presumably fires were lit underneath the ore, causing the arsenic to vaporise. Arsenic crystals would then sublimate onto the cold roof of the flue and some unfortunate person would be sent in to scrape the arsenic off! One flue runs up a small wooded hill whilst the other is on the flat.

Arsenic sublimation flue - Ceunant

Further north are a series of small depressions in a line trending westwards from the river along the lode. These are the remains of shafts, one of which was being used as a bonfire by someone (producing noxious fumes from burning plastic). At least one shaft is still open, although it has been covered by a corrugated iron sheet and disguised with rocks and soil. The lode outcrops at the river as indicated by a thick vein of quartz. There appear to be some workings on the river bank itself. There is also a choked adit with a small hole giving access to what seems to be a water filled level. This was not entered. Given the apparent shallowness of the working it is strange that the area was not worked as an opencast. Again the vein appears to be associated with faulting in cleaved mudstones of the Marchlyn Formation.


Drawing showing features of
Ceunant Arsenic Mine, Nant Ffrancon
RG Jan 1997
Adit near quartz vein
Line of Depressions
Grid North
Flue on flat
Flue up hillside
Afon Ogwen
A5
Path to stile near bridge
0
25
50
Approximate scale in metres

Pant-y-wrach Copper Mine, Llanfrothen

by Robin Griffiths

This article describes Pant-y-wrach Copper Mine and our exploration of it last year. I am very grateful for much information received from Harold Morris. The relative altitudes diagram and adit grid references are taken from documentation (which describes the mines in more details than I do) written by him.

Pant-y-wrach is an old copper mine situated on the wooded Cefn Coch hillside near Llanfrothen. Copper was exploited from a series of two workings on separate converging lodes - one East-West (described in this articles as the western workings) and the other trending North West-South East (described as the eastern workings).

Old kettle - side passage in lower stope—PYW west

Head of second pitch - PYW west

Eastern Workings

Myself, Dean, Brian and Elidir Owen initially visited the eastern workings.

Lower Adit - East

The dammed lower adit on the hillside behind Pant-y-wrach cottage was explored to a boulder choke. A side passage on the left leads to a small chamber with ochreous mud with a tricky 15’ climb to a stope above. From this point an unclimbable 20’ shaft leads upwards to a short level to the surface. A small blockage to the left after the initial climb was dug by Brian. Quite a bit of muddy water is apparently dammed behind this and Brian was converted into a chocolate soldier by his exertions. We initially believed that this choke was the bottom section of a stope higher up the hillside, but following conversations with Harold and superposition of the survey on an old OS map, the bottom of the stope is more likely to be in the vicinity of the first choke visited.

Middle Adit - East

This is a small adit which enters the top of the stope accessed by climbing up from the lower adit. A small section of false floor leads to a very short continuation.

Brian descending a stope - PYW west

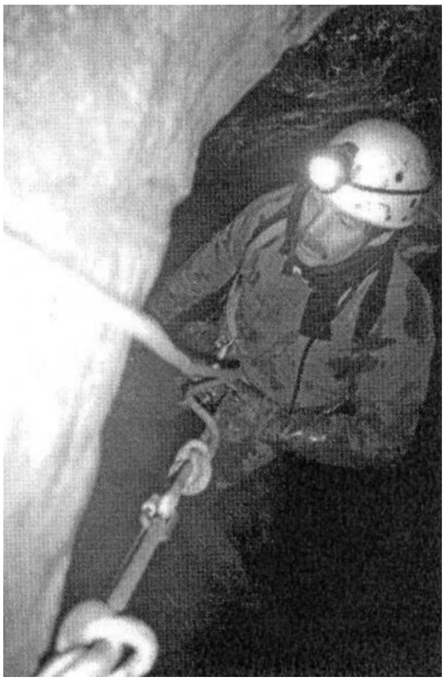
Blocked Adit - East

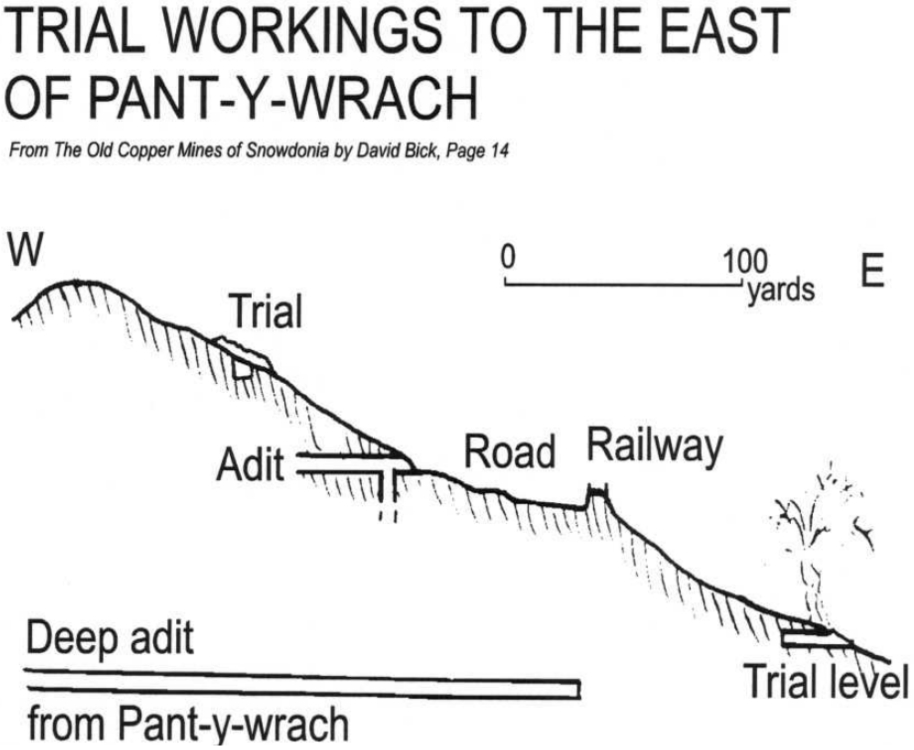
To the south west of the Middle Adit is a blocked adit. This enters the top stope workings as a crosscut about half way down.

Shaft to stope - East

A belay to a handy tree gains access via a tricky vegetation and rubble covered slope to the stope which is of the order of 100’ deep. The descent initially lands on the edge of a continuation of the crosscut previously mentioned. This leads about 100’ into the hillside following some old rails. Brian descended to the

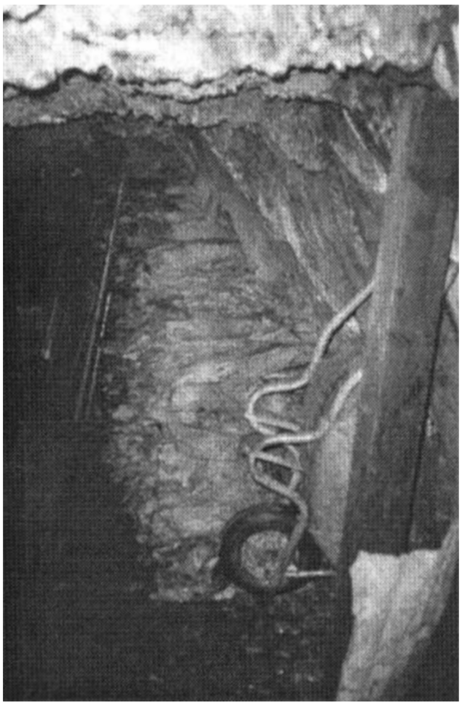
⇨


Second pitch - PYW west



TRIAL WORKINGS TO THE EAST OF PANT-Y-WRACH

From The Old Copper Mines of Snowdonia by David Bick, Page 14

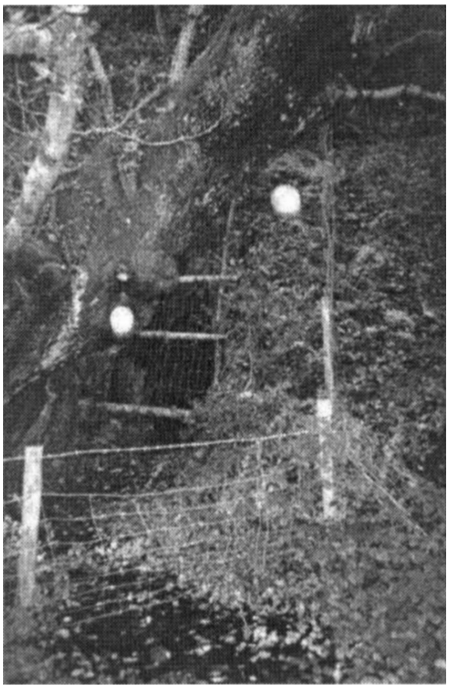


Collapse area - PYW Deep Adit

Trial Workings

The main lode of Pantywrach, eastwards from the summit of Cefn Coch, in places revealed as a massive vein of quartz. The adit near the road was apparently driven without gunpowder, and can still be inspected.

bottom of the shaft, but remained on the rope due to the unstable looking nature of the bottom. On the way up he swung to a short continuation to the north east.



Pant-y-wrach Deep Adit entrance of western workings

Higher up the hillside is a flooded shaft

Western Workings

The western workings weren't visited by us until after the cave rescue practice which took place at Pant y Wrach and Bwlch y Plwm. I had an initial reconnaissance during the summer and had decided on this area as one of the rescue venues. The western area consists of a number of deep looking stopes. One of the rescue teams descended these workings and ran out of ropes before being re-called to the proper rescue site. They took the 'standard' route which enters one of the stopes via a short wired up adit.

It was a few weeks after that myself, Andy and Brian visited. Unfortunately we didn't see the adit and tried unsuccessfully to rig the first two stopes. One of the stopes at the top of the hill was eventually rigged off a tree, with a wire re-belay 10' down to avoid a nasty rub point. A 100' pitch drops down into the Shallow Adit level. The now blocked shallow west adit SH61684045 is somewhere in the vicinity of a slippery gully climbed on the way to the stopes.

Another pitch head was encountered in a rather unstable looking area. The pitch was rigged with a re-belay just under the wooden hatch type access hole. The pitch follows a wobbly pipe down the stope to a short intermediate level which has an old miner's kettle. The continuation of the pitch leads down a slope and under a wooden platform to land at Deep Adit level. The Deep Adit was followed for about 200m through steadily deepening chest deep water to a boulder collapse.

On this occasion we didn't notice where the shallow adit comes in.
†6

⇨

There are further adits on the Ffestiniog Railway side of the hill as illustrated in the diagram taken from The Copper Mines of Snowdonia by D. Bick (from which a historical background of the mine can be obtained). In this drawing, the Pant y Wrach Deep Adit is shown reaching underneath the Ffestiniog Railway. This is in excess of the passages explored by ourselves. Harold also mentions stories about children taking in their father's lunch (probably anecdotal) from the south eastern side of the hill. We didn't notice any SE continuation on our visit.

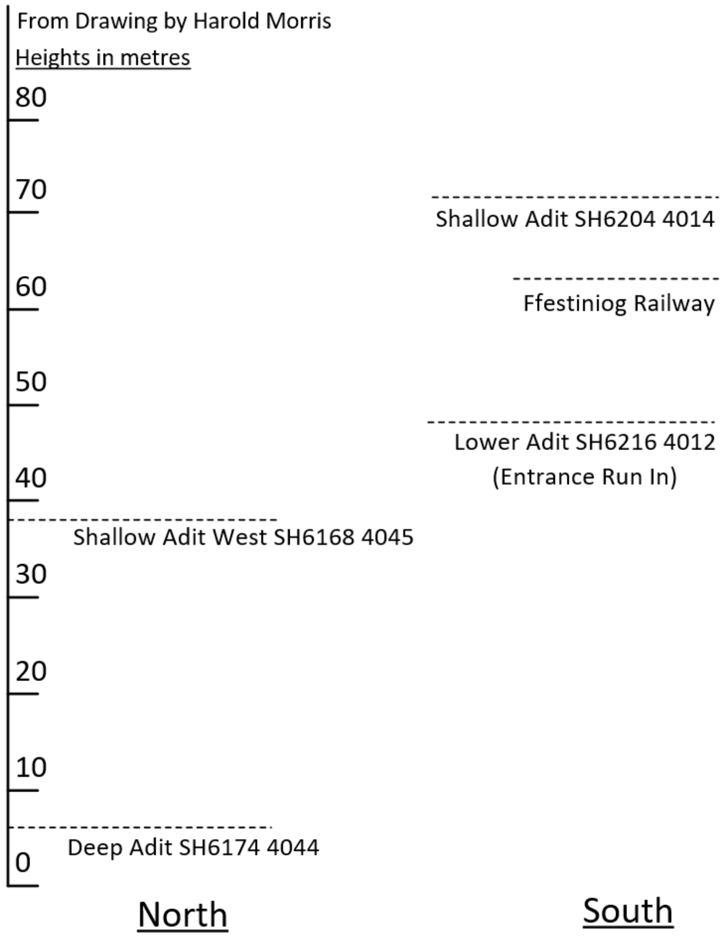
Western workings Deep Adit - SH61744044

The remaining major entrance is the Western workings Deep Adit whose entrance is quite some distance to the north from the western workings. About 50m from the entrance, the passage swings southwards leading to a collapse. An attempt to tunnel through has been made as evidenced by a shored up area. The blockage is not far from the Deep Adit blockage as encountered by descending the western stopes.

Outstanding tasks at Pant-y-wrach are:

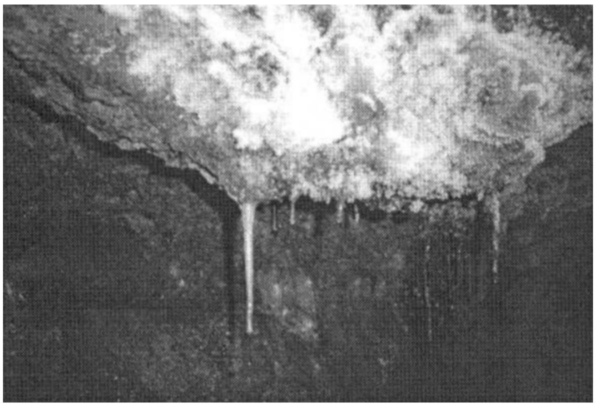
- Completion of eastern workings survey. This will entail descending the surface shaft again. Also the stope above the lower adit needs to be surveyed.
- Investigation of the two boulder chokes in the Eastern lower adit.
- Descent of the western workings via the 'normal' route. Investigate Middle Adit section & any continuation into hillside.
- Examination of Ffestiniog Railway side of the ridge.

Relative heights on north and south sides of the hill, referred to Ordnance Datum

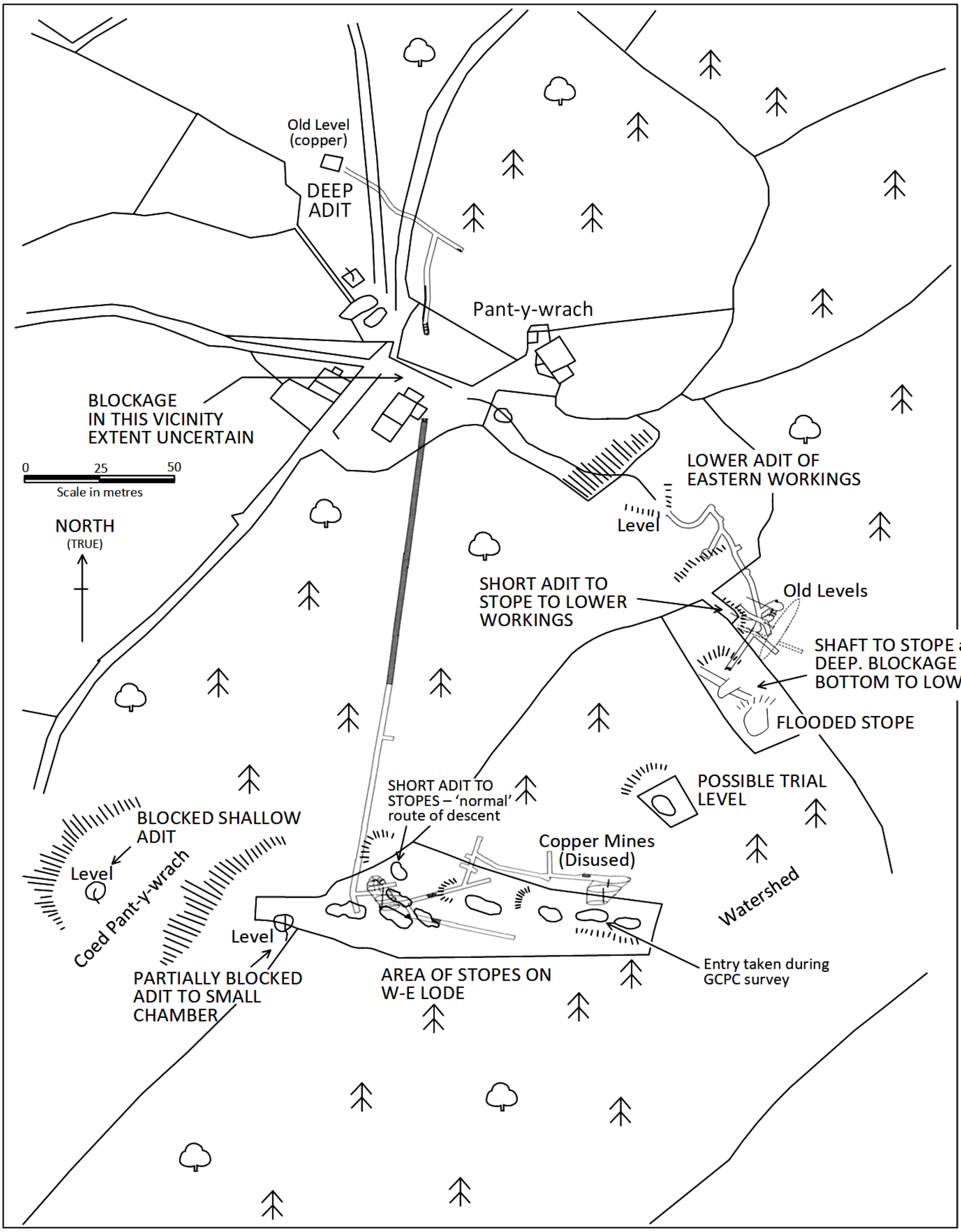


The mine appears to have been initially worked during the 1820's but not on a regular basis until the end of the 19C and early 20C. The mine was last worked during the First World War when up to 28 men were employed.

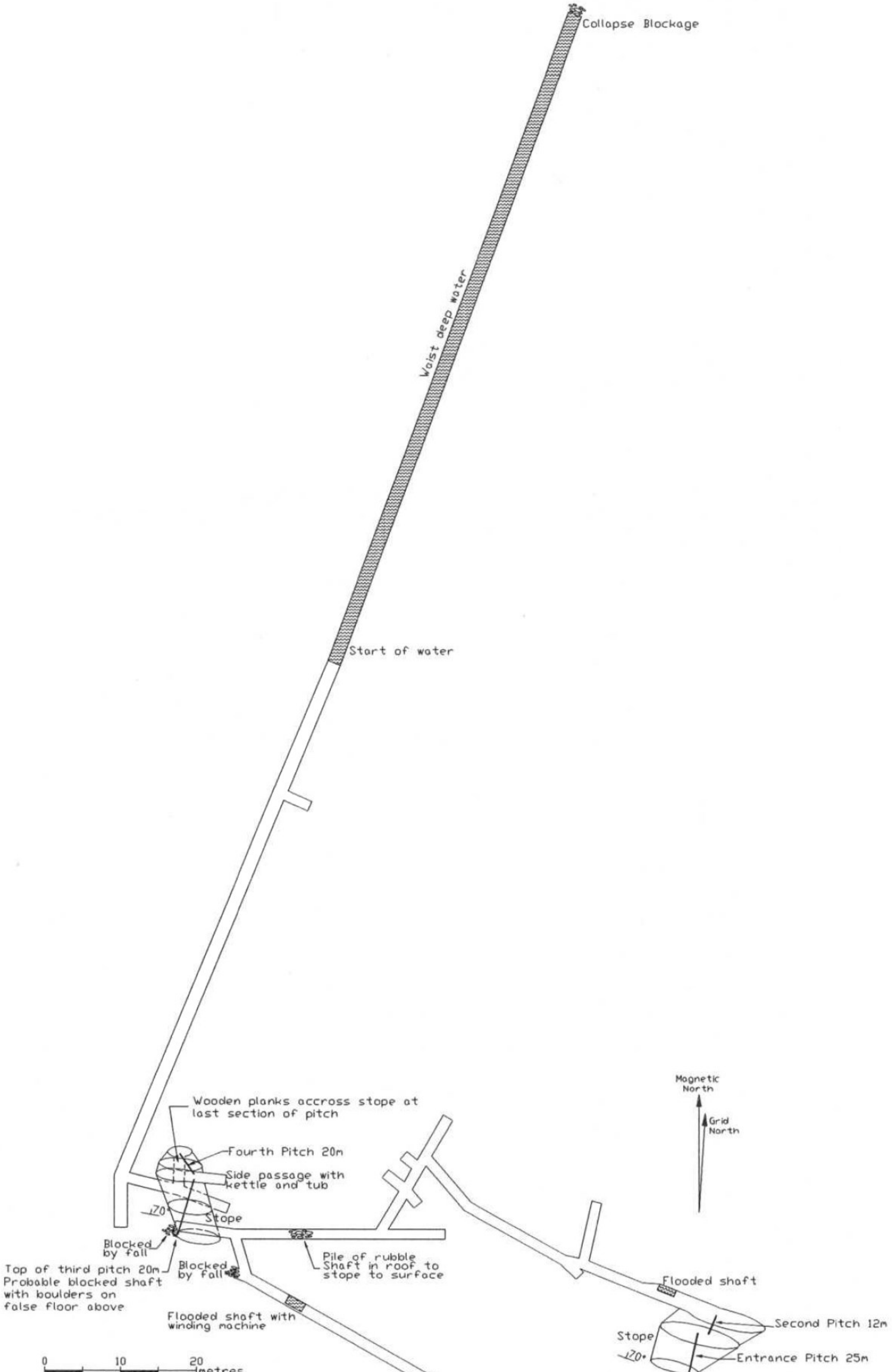
A report in *The Memoirs of the Geological Survey. Special Reports on the Mineral Resources of Great Britain. Vol. XXX. Copper Ores of the Midlands, Lake District, North Wales & the Isle of Man. 1925* describes Pant-y-wrach thus: *Shafts and levels near Ty Mawr (Penrhyndeudraeth). The country rock consists of sediments of Llandeilo age. There are two lodes: one courses nearly due East-West, and dips northwards at 80°, and the other North West-South East and dips North eastwards or is near vertical. In width they both range up to four feet, and consist of a gangue of quartz and calcite penetrated by small stringers of yellow copper ore. There is also some galena. The mine has been worked by a shaft, 45 yards deep and two levels of length 300 and 500 yards, respectively.*



Stals in Pant-y-wrach



PANT-Y-WRACH AREA SHOWING POSITIONS OF ADITS AND INFERRED APPROXIMATE POSITIONS OF UNDERGROUND WORKINGS BASED ON GCPC SURVEYS. BASE MAP Os Survey 1:25,000 dated 1915

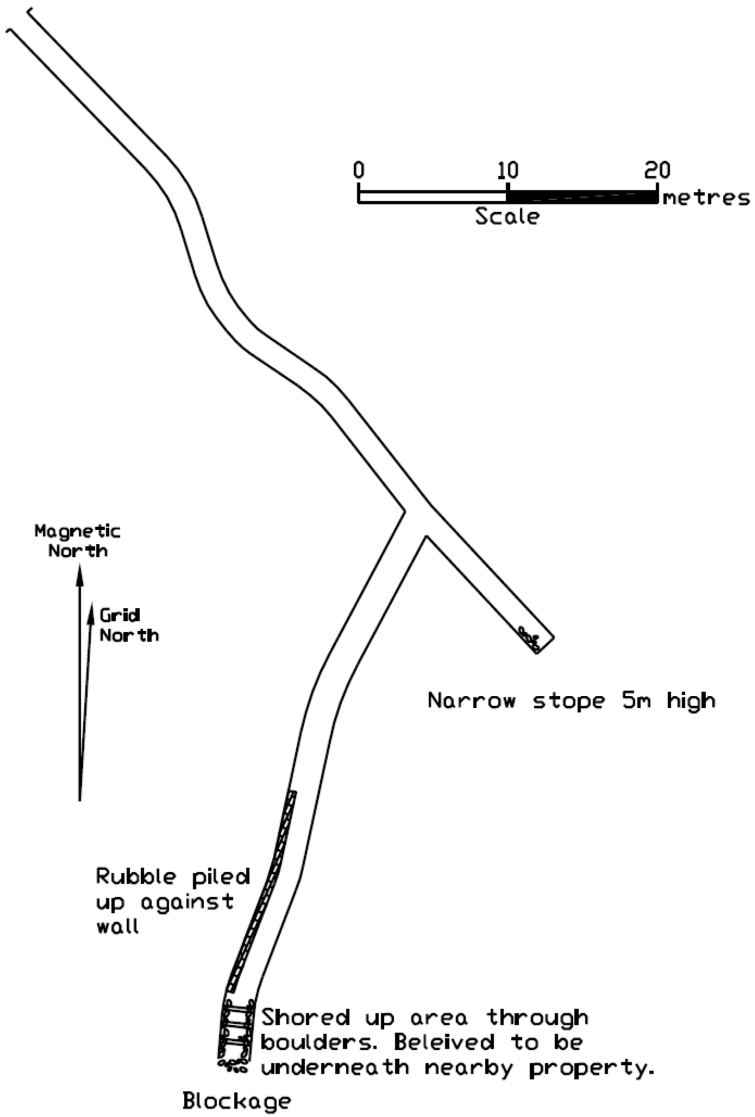


SURVEY OF WEST LODE WORKINGS OF
PANT-Y-WRACH COPPER MINE, LLANFROTHEN

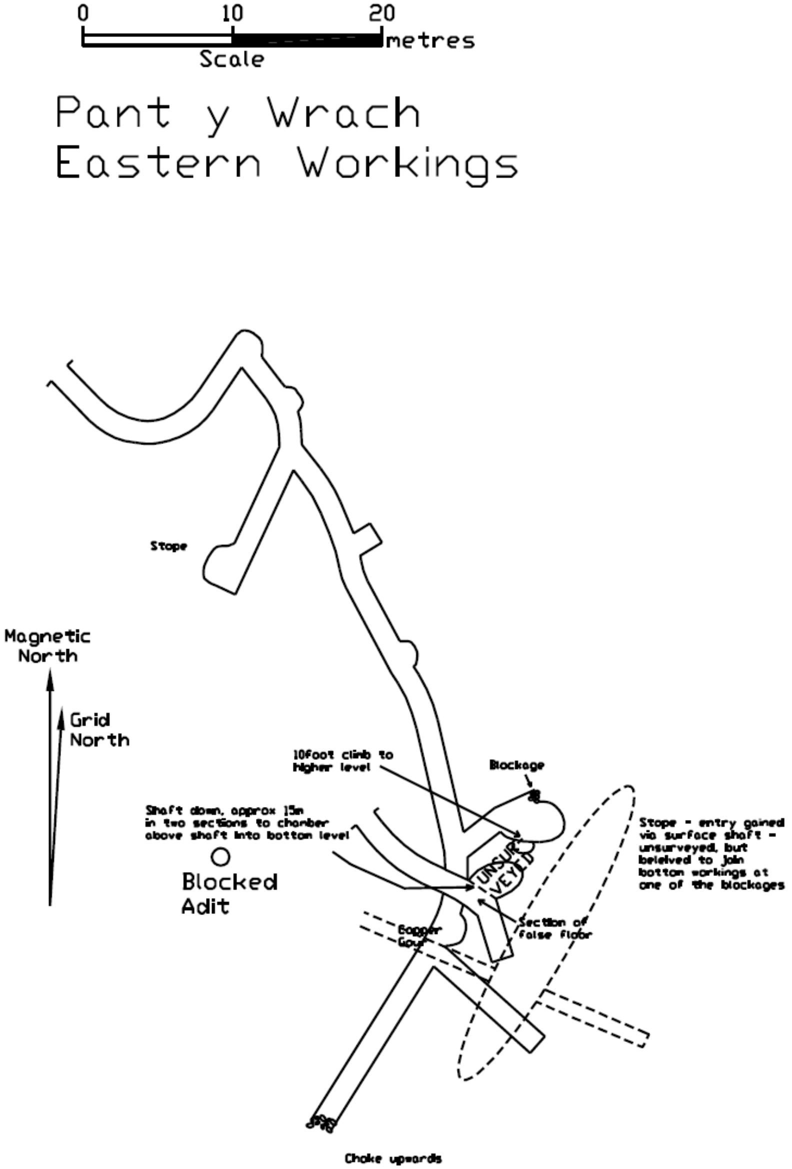
Surveyed by Gwynedd Cave & Pothole Club, R. Griffiths, A. Goodall, B. Davies Nov 21 1996
BCRA Grade 3

See separate Area Plan for relationships between adits

Pant y Wrach
Deep Adit Entrance


0
10
20
metres
Scale
Magnetic North
Grid North
Narrow stope 5m high
Rubble piled up against wall
Shored up area through boulders. Beleived to be underneath nearby property.
Blockage

Pant y Wrach
Eastern Workings


0
10
20
metres
Scale
Stope
Magnetic North
Grid North
10foot climb to higher level
Blockage
Shaft down, approx 15m in two sections to chamber above shaft into bottom level
Blocked Adit
UNSURVEYED
Stope - entry gained via surface shaft - unsurveyed, but beleived to join bottom workings at one of the blockages
Bogger Gour
Section of false floor
Choke upwards

Surveyed 16/12/96 by R. Griffiths
to BCRA Grade 3

Bwlch-y-plwm Lead Mine

by Harold Morris

Location and Extent.

The mine is situated on land fonning part of Bwlch y Plwm farm, the lower workings being about two-hundred metres east of Llanfrothen church A number of levels extend in a north-easterly direction to a point a short distance beyond the present farmhouse of Bwlch y Plwm, being located on the north west face of the ridge, above a line drawn from the lower works mentioned to the farmhouse. Of the few lead mines in this part of Gwynedd, Bwlch y Plwm could be described as extensive.

History

It is probable that lead was first raised here a great many years ago, people refer to Roman workings, and indeed one vein is referred to as the Roman Lode or Vein on a plan dated 1876. However this vein was not very productive, and would not have been at all obvious from surface indications; the most obvious site would have been the Main Lode, mining up the hillside from the present farmhouse to a point almost on the crest of the ridge, where a large open cut may be seen. At this high point there would have been a minimum depth of soil and peat covering the rock.

An early record is that recorded by Edward Llwyd in his Parochialia of 1695. described as “Being a Summary of Answers to Parochial Queries”. Here the reporter, probably the vicar of the parish stated that “They have dug for lead near ye church.”

Later a lease of the Bwlch y Plwm lead mine was granted to one Thomas Barker (described as a “gent”) by Dame Margaret Owen and William Owen Esq in May of 1726. Nothing further is known of his efforts.

An account book covering the period 1795 to 1802 gives a good insight into the way a small mine was run, this gives details of pay received by partnerships in sinking, driving and raising ore. Costs of items such as spades and other tools, and also details of the shareholders and any calls made upon them to inject further capital. The company was called the “Bwlch y Plwm Lead Mining Company Ltd”. It is unfortunate that the sections worked during this period cannot be identified on the plan of 1876. A number of entries in the book show that beer was supplied to the workmen on ore weighing days.

For a long period after 1805 there are few references, a further lease being sought in 1837 and yet another in 1854. *The Mining Journal* for 1854 makes references to Bwlch y Plwm Gold Mines, with assay values reported as upward of 2 oz per ton. On the following page an advertisement appears requiring the services of an experienced mining captain, applications to be addressed to Mr Hyde Clark, 189 Strand. These entries serve to show how contagious the gold fever of the Dolgellau area could be.

Another company was formed in July of 1863 having Samuel Holland as Chairman, and set up on the *cost book* system. This was registered as the “Bwlch y Plwm Lead Mining Company Ltd.” One of the shareholders, a mining engineer named Walter Eddy submitted a plan of action whereby the Main Vein could be worked in depth below the Day Adit (At about the level of the farm house) by the erection of a waterwheel to power pumps in a new shaft to be sunk close to the portal of the day adit. This shaft would have a cross cut driven to the vein at a depth of 20 yards, while at a point about 20 yards deeper the vein was expected to be cut. Drives would be made on the course of the vein at these horizons. This work was completed in part only, i.e. the cross-cut at 20 yards followed by the driving on the vein for about 60 fathoms.

The ground opened up in the above operation yielded a good return of ore, but in the face of mounting difficulties with water, due to insufficient power being available for pumping, this part of the mine was abandoned, and a start made on a deep adit cross-cut at about 50 feet above ordnance datum, at the south western end of the sett.

Financial difficulties and disputes however brought all work to a standstill with liquidators being appointed on the 29 May 1868. The final winding up meeting was held on the 8 February 1871.
It would appear that the company was placed in the care of trustees who continued working on a limited scale until on the 30 August 1875 an agreement was made between a Daniel Clarke, and others of the one part, and the trustees of the other part to purchase the mine, obtain a new lease, and continue working as “The Penrhyndeudraeth Lead Mining Company Ltd.” The solicitors appointed for the new company were Messrs Breese, Jones and

⇨

Casson of Portmadoc, and the consultant engineer was W.B. Jeffreys, of the Tan y Bwlch Mine at Abersoch. (A number of the engineers' regular reports available give useful detail about the proposals, hopes and progress at the mine during the life of this company.)

This company continued with the work of driving the deep adit cross-cut, with a few interruptions due to disquiet about the cost of the operation, until it was thought that the Main Lode had been cut. A survey was done by Messrs Spooner & Co which indicated that they had another 26 yards to drive, which at the rate achieved for previous driving of approx. 20 feet per month, would take about three months. This report by the company secretary was dated 30 July 1878. In the manager's diary the report for Monday 9 December 1878 reads *"Cross cut no alteration in the nature of the rock and very dry, not the least sign of the vein since we left the last branch which in my opinion is the vein and should be driven on"*.

It is obvious at this stage that shareholders were getting worried. However at a general meeting of the company held at the Alexandra Hotel, Dale St. Liverpool on 27 December 1878 the following decision was made:- *"The meeting thinking it not desirable to make any further Calls at present, empower the Directors to spend the sum of one hundred Pounds or thereabouts in developing the string of Quartz referred to in the last report."*

There are no other reports available, describing the above development or of any continuation of the cross-cut; it is possible that the stringer of Quartz investigated was indeed the Main Vein which had pinched out at depth.

In driving the cross-cut three veins were intersected, being the Roman Vein, Lower Vein and Middle Vein, of these the Lower Vein was the most productive, being followed down to about ordnance datum. The Roman Vein was worked on at two points where sinking took place again to about Ordnance Datum, above adit level there was little or no yield. The Middle Vein was not found to be productive at this horizon, and was not opened up, even though higher workings were productive.

An Extra-Ordinary General Meeting to be held at The Angel Hotel, Dale St. Liverpool on 28 August 1882 was called to confirm the Special Resolution passed at a previous meeting on 7 August 1882 to wind up the said company voluntarily, and to appoint a liquidator forthwith.

It would appear that the mine lay dormant for many years after this until William Lloyd of Ty'n Twll. Gwydyr. Llanrwst together with James Goddard of Bryn y Fawnog, Nantbwlchyrheurn. Llanrwst sought a lease to search for minerals on this sett. The results of this enterprise are not known.

The final working in the early years of the 1920s was by a company called the:- Union Zinc Mining Co Ltd. with offices at 19 High Street Portmadoc. This company were also engaged at the Moelwyn Mine, Blaenau Ffestiniog, and also the Gamallt Mine Ffestiniog.

It is thought that very little work was done at Bwlch y Plwm by this concern, apart from the possible erection of the mill to be seen close to the portal of the Deep Adit Cross-cut, and a small amount of development underground; inspection of the mill site gives the impression that no machinery was ever installed.

This brings to an end this brief history of the mine, but it is certain that more information must be hidden away in various archives.

No source references are given in this account, but inspection of the "Breese, Jones & Casson" collection at Caernarfon Record Office will be rewarding, together with the "Brogyntyn Manuscripts" at the National Library of Wales. Aberystwyth. Other sources are the "Mining Journals" and "Mineral Statistics".

© Harold Morris.
Porthmadog. March 1997.

A Surface Tour of Bwlch-y-plwm Lead Mine

by Harold Morris

It is as well to start at the point where the very first mining operation took place, this is a large open-cast working almost on the crest of the ridge, and immediately above Bwlch y Plwm farm house. It is apparent on inspection that this place which is on the Main Lode or Vein has been very productive, and would appear to be at a point of intersection of two or more veins. A large boulder forming part of the wall of a mined structure, has hollows in its upper surface where ore was dressed during early days.

A little under a hundred yards, south west of this place, and at about the same level, lie the upper workings of the Middle Vein. These comprise a blocked adit with a narrow stope or shaft above while higher still a short level has been stoped upwards to day.

Descending the hillside from here one reaches the public footpath, where there is further evidence of working on the Middle Vein. An open level between the wall and the track leads into a flooded sink with rock filled stope above, the level continues for a short distance to a point where a slot has been cut in the floor.

Traversing north east at about this level brings one to what might be called the No 2 level on the Main Vein, this is blocked but can be accessed from the open works above by way of a very wet and dirty stope.

Bearing in mind that walls should not be crossed return a few yards to the south west, to the public path where a gate allows access to the area below the wall, the path passes above the farm house and between it and a large corrugated iron barn. Behind the barn a pit choked with rubbish and full of dirty water marks the portal of the No 3 level on the Main Lode, This is referred to as the day level in some documents. The pit drains along a ditch close to the barn.

Crossing the ditch at a convenient place near the front of the barn and climbing a few feet on to a level area, an old track will be seen to pass close to a flooded shaft, this shaft is marked on the plan as the No 2 Lower Shaft, and is the one that was sunk to exploit the lower vein in depth, being equipped with a pump, and powered by a water wheel, being about one hundred yards from the shaft collar. Follow the stream from the barn down to the wheel pit.

The wheel pit survives, and is in reasonable condition. The wheel would have been coupled to the balance bob at the shaft collar by means of flat rods; it would seem that the small ruined buildings between the wheel pit and shaft were built at a later date. One of the ruined building has evidence of having had a small wheel, probably for agricultural purposes.

Ascend through the trees to the south east passing to the right of the house, here a low tip and partially closed adit marks the lower workings on the Middle Vein. Above this point, a line of workings extend up to the vicinity of the gate on the public path previously mentioned. These workings comprise another open adit (a wet through trip is possible to the one below) and a stope which can be entered by a narrow slot (ladder recommended) which can be rather awkward to exit.

From the lower level a path leads south west to a small dry reservoir, where the path passes through a narrow opening in a wall. Here on the left of the path is the open portal of the No 4 level on the Lower Vein (This narrow level gives access to a large section of underground workings which have been equipped with fixed ropes etc., and which are used by school parties.

Passing through the gap in the wall and turning left, the wall is followed to a tip and flooded level, this is also on the Lower vein, and is level No 3. At the foot of the tip, and close to the wall a depression marks the site of an old shaft which was sunk to the No 4 level.

Higher still, another tip and open level is the No 2 level. The date 1840 has been carved on the left wall of this level a few feet in, but beware of a dangerous shaft a few feet beyond.

Higher again and almost lost in the undergrowth a small trial level may be seen, which is the No 1 level of the Lower vein.

Returning to the gap in the wall, follow the path down for a few feet, a small tip and an open shaft above the path, is an air shaft sunk to the Deep Adit Cross-cut. The shaft is about 75 feet deep but is blocked for a number of feet at the bottom. ⇨

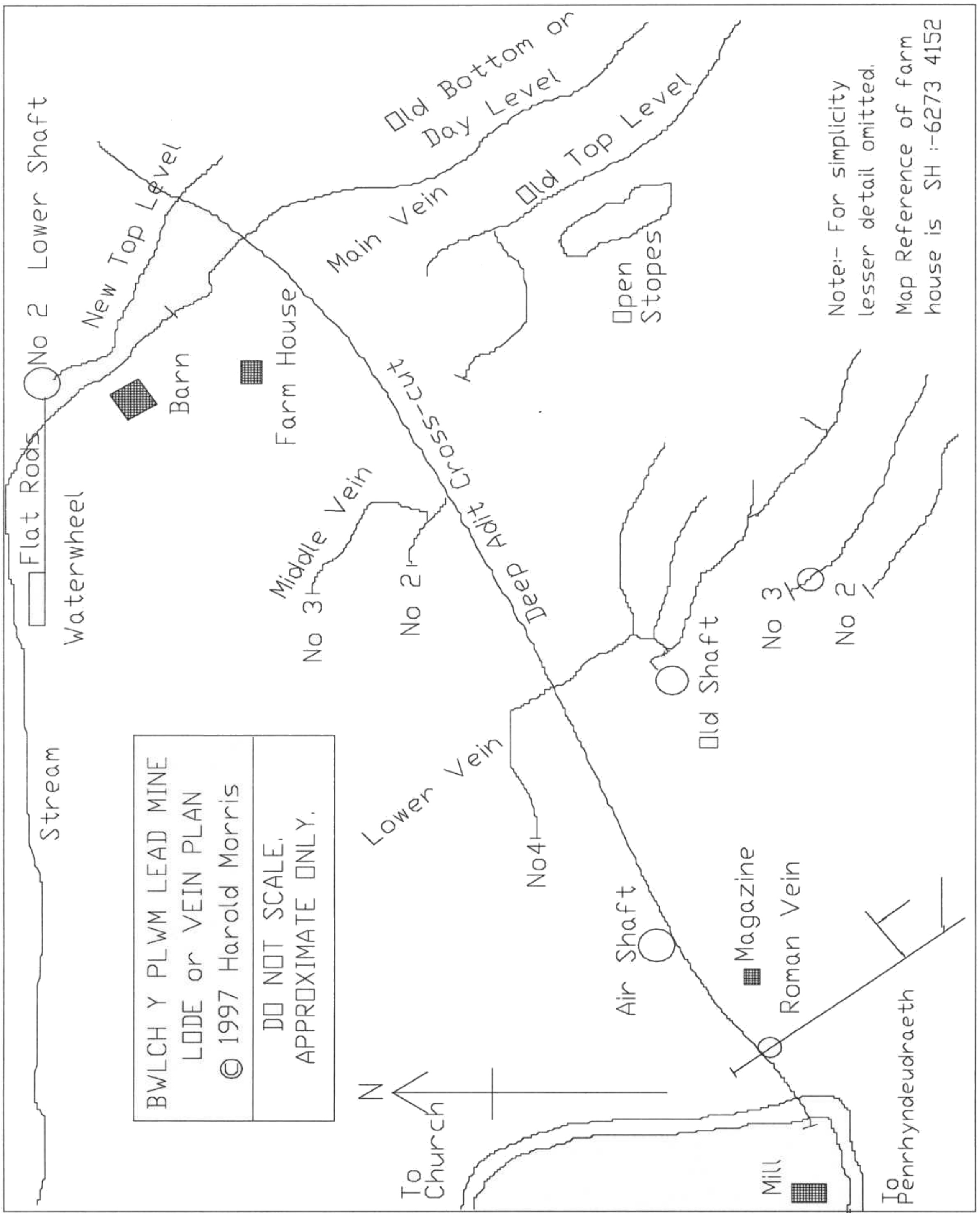
Continuing down, and passing a mined building a small powder magazine is seen above the path, this is used as a holiday bunk house, and is therefore in a good state of repair.

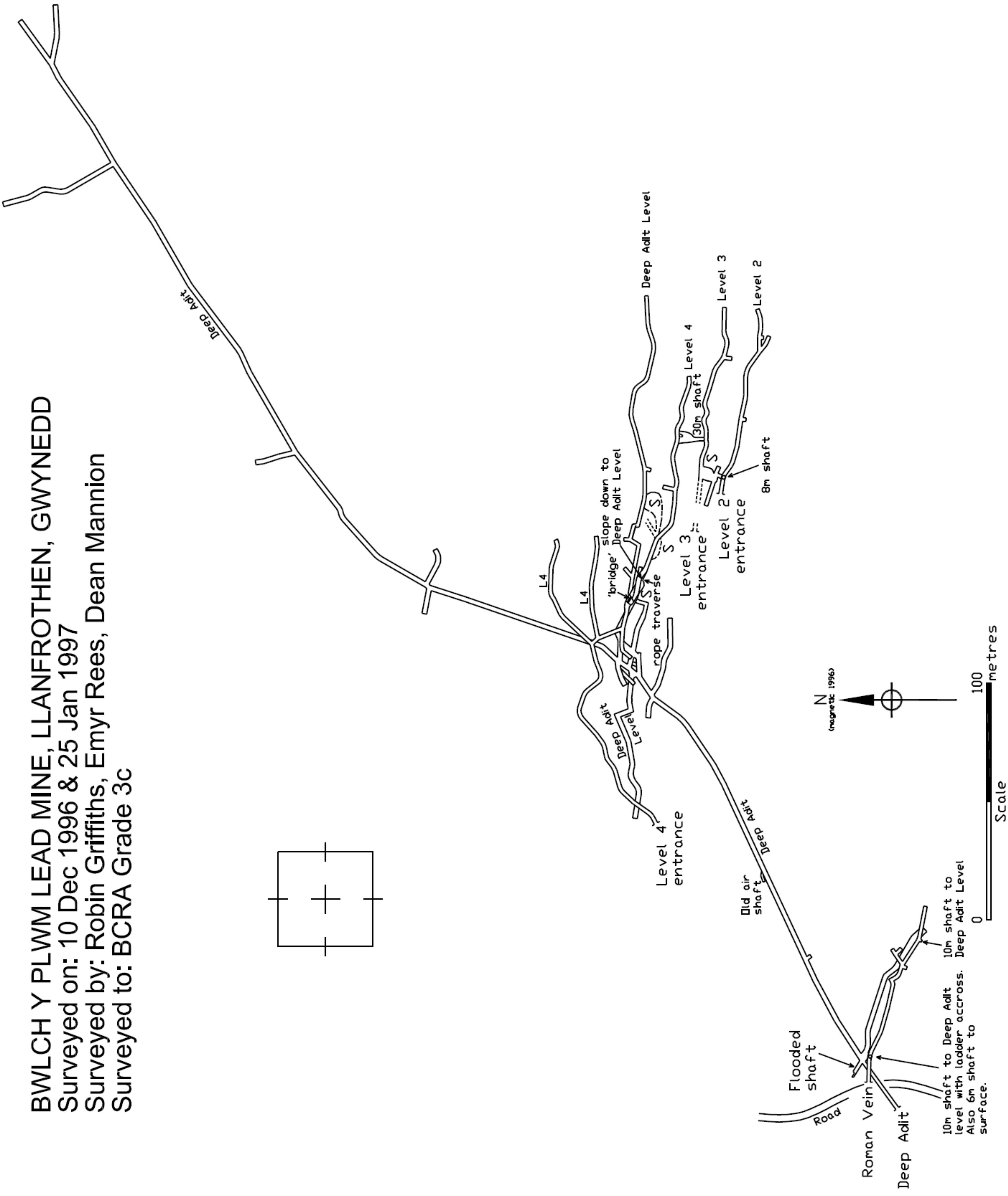
Lower and just before reaching the tarmac road, a level on the left has been driven on the Roman Vein, beware again of a dangerous shaft a few feet in.

Crossing the road, and using a convenient gateway, a large level area of tipped material is reached, the Deep Adit Cross-cut portal being situated in the bank below the road. This level represents the great effort that was made to work the mine in depth and which was ultimately a failure in opening up the hoped for riches of the Middle and Main Veins.

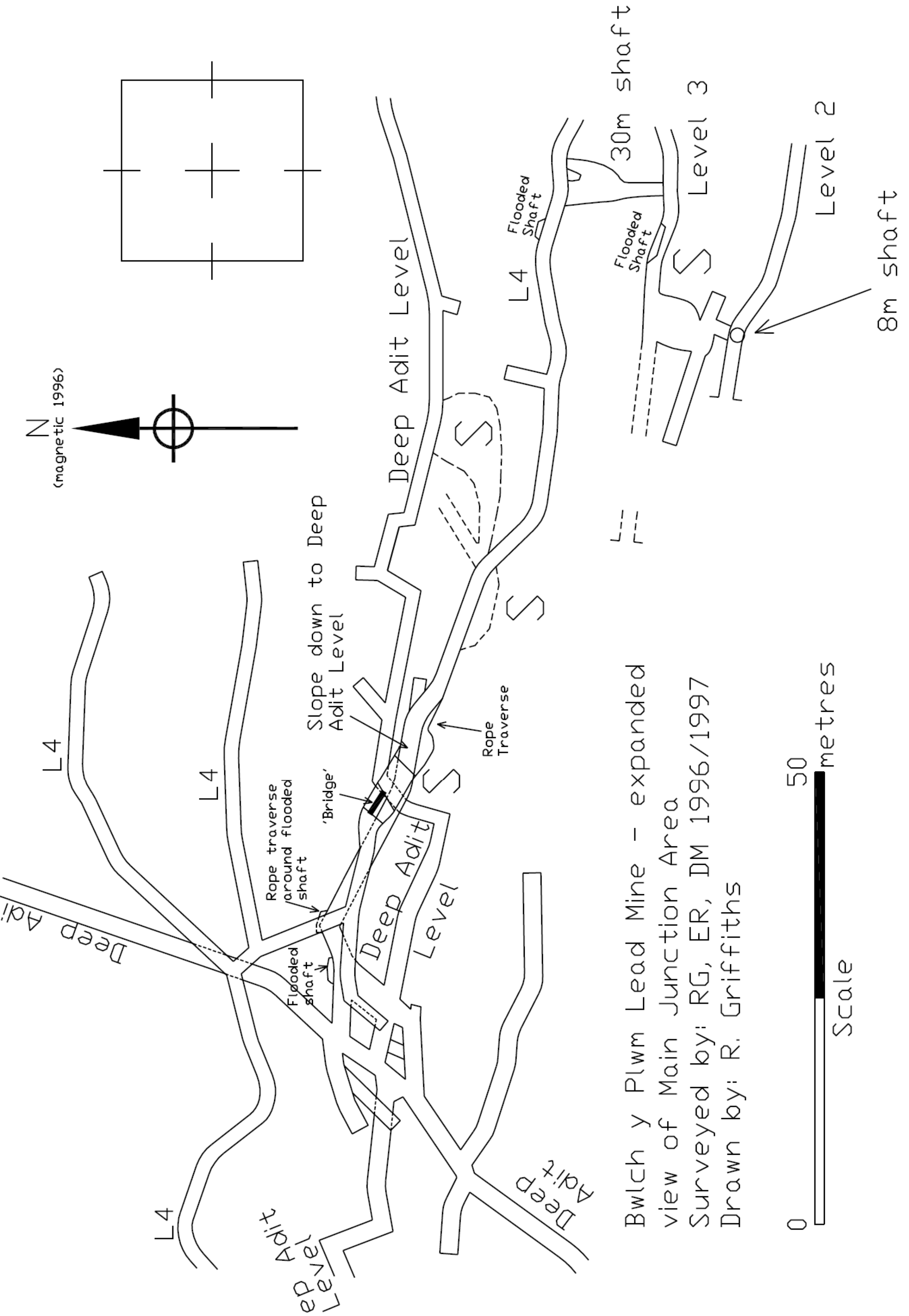
Close to the level portal lies the mill site, an interesting collection of concrete foundation blocks, probably erected during the brief period of reworking during the early 1920's. The old plan shows a mill equipped with a water wheel here. Please take all care when walking over this property, making every effort to obtain permission when exploring in the vicinity of the farm house. It is all private land, and advantage should not be taken of the resident owners. Use paths where possible and avoid crossing walls and fences. Thank You.

© Harold Morris.
Porthmadog. March 1997.



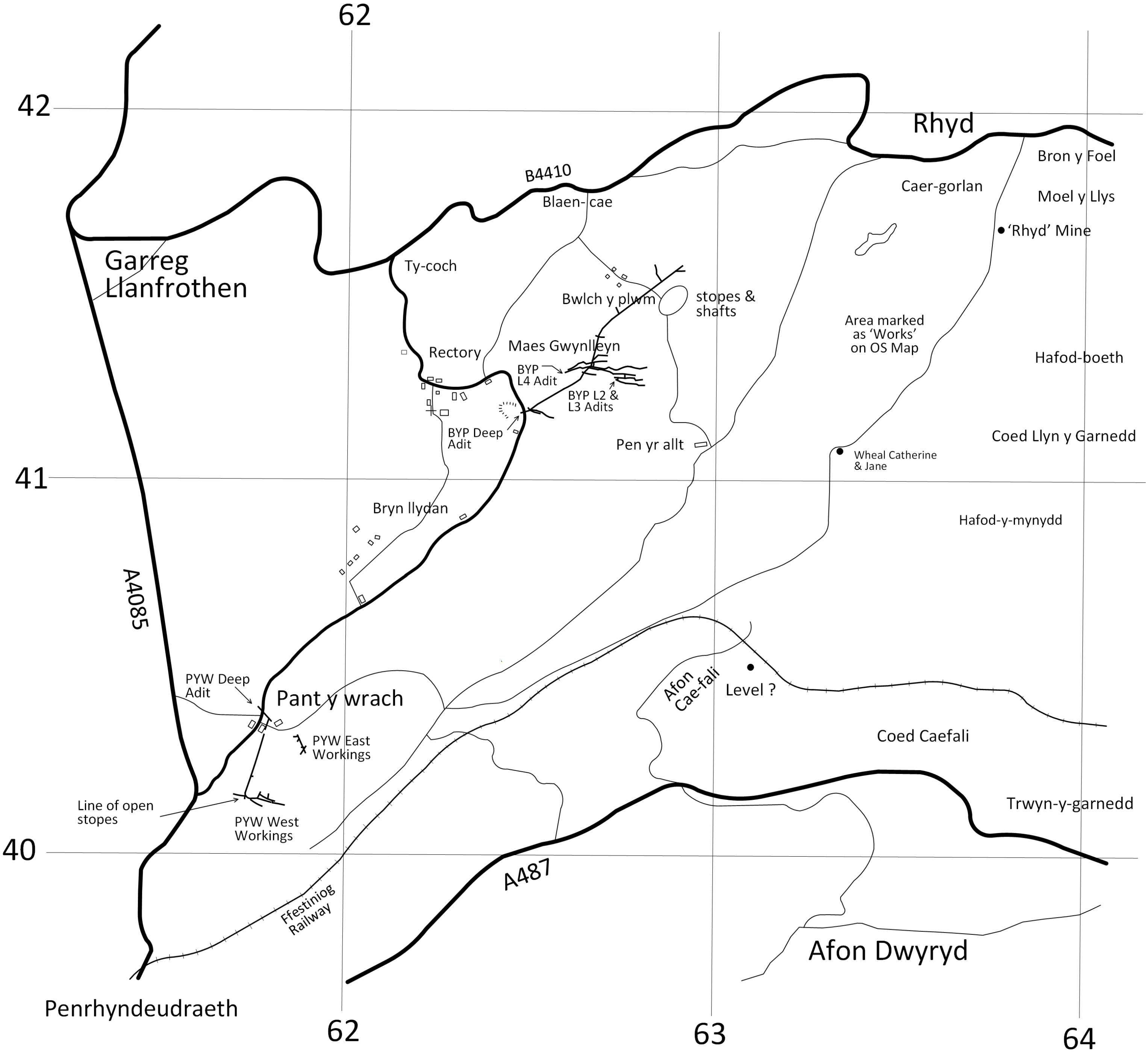


BWLCH Y PLWM LEAD MINE, LLANFROTHEN, GWYNEDD
Surveyed on: 10 Dec 1996 & 25 Jan 1997
Surveyed by: Robin Griffiths, Emyr Rees, Dean Mannion
Surveyed to: BCRA Grade 3c



Bwlch y Plwm Lead Mine - expanded
view of Main Junction Area
Surveyed by: RG, ER, DM 1996/1997
Drawn by: R. Griffiths

Map showing the locations
of mines in the Llanfrothen
area. Drawn by R. Griffiths
January 1997



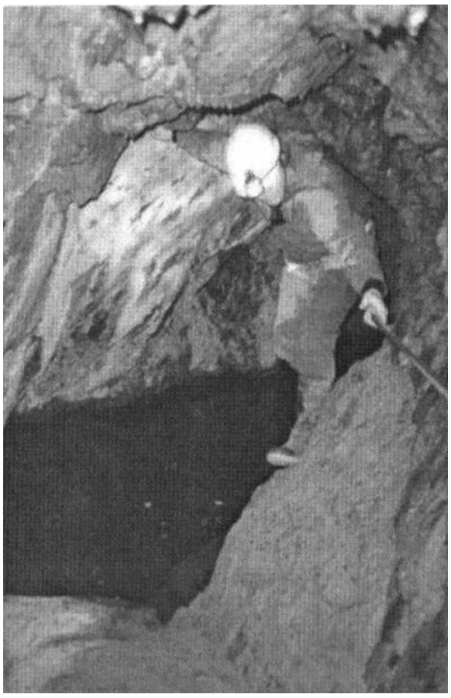
The above is a smaller scale map of the Llanfrothen and Penrhyndeudraeth area showing the positions of the principal mines - namely Bwlch y Plwm, Pant-y-wrach and Catherine and Jane. Each square is 1 kilometre square and annotated relative to National Grid letters SH.

CRO Call Out Rescue Practice

by Andy Goodall

On Sunday 6 October the North Wales Cave Rescue Organisation were mobilised and converged on a lay-by near Penrhyndeudraeth. They were met by Robin and Andy and a pile of virgin cave rescue equipment from the Gwynedd Store. There was a report that a young man had gone to explore some of the mines in the area and had been reported missing. There were three possible systems that he could have ventured into; Pant-y-wrach, Bwlch-y-plwm west and Bwlch-y-plwm eastern workings in-between. The scene was set for the first underground rescue practice to be mounted from the Gwynedd store.

The surface controller was nominated and search teams were formed to enter each of the three systems. After a couple of hours there was a request for more rope for the Pant-y-wrach search team and as that was being despatched it was reported that the casualty had been found at the bottom of the Bwlch-y-plwm system. He had fallen down a shaft and had suspect spinal injuries. He was cold but was conscious and in good spirits.

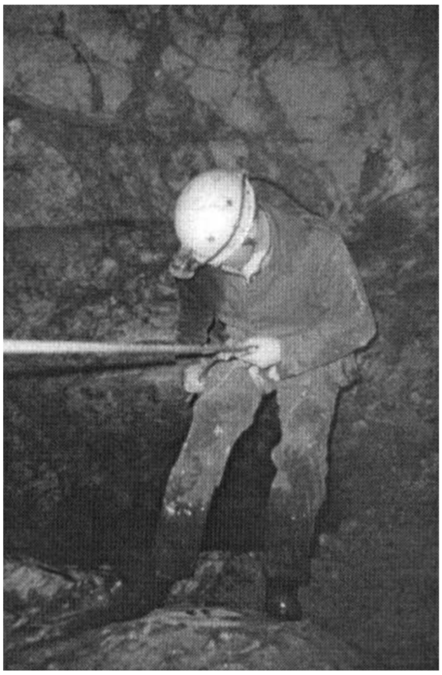


Negotiating the traverse pool

The incident control point and all the equipment was moved down to Bwlch-y-plwm where the task of rescuing the casualty began. The little dragon, stretcher and cas bag were delivered and while Rob, our volunteer casualty was being warmed and manhandled into the stretcher the pitches were being rigged and telephones were set up for the long haul out. †7

After manoeuvring around a suspect false floor the carry out began with a straight forward walk through wellie deep water to the first obstacle. This was an interesting little problem and consisted of a traverse around a corner on a narrow ledge above a flooded shaft. A little initiative found the solution and the stretcher was slid over a bridge formed with series of knees.

The next task was to get the stretcher up an incline of about 30 feet. Using the “Z” rig Rob was hauled, pushed and shoved up the pitch. There was a short delay while a rope was transferred to the next slippery, slimy 100’ pitch. A short level then led up a slope to the short entrance pitch. Again, using the “Z” rig and a team of enthusiastic haulers on the surface, the stretcher was hauled up the pitch with the medic alongside on an SRT rope.



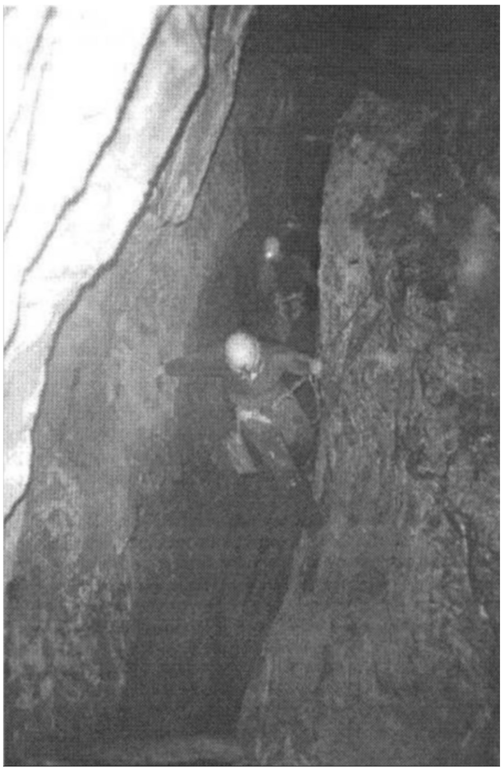
Emyr descending Level 4 pitch

The practice went smoothly with the importance of good command and control and communications both underground and on the surface being brought out. All in all a good training exercise was enjoyed by all. Brian and Dean filmed the whole incident on video which was shown to the team during the following surface meet as an useful training aid.

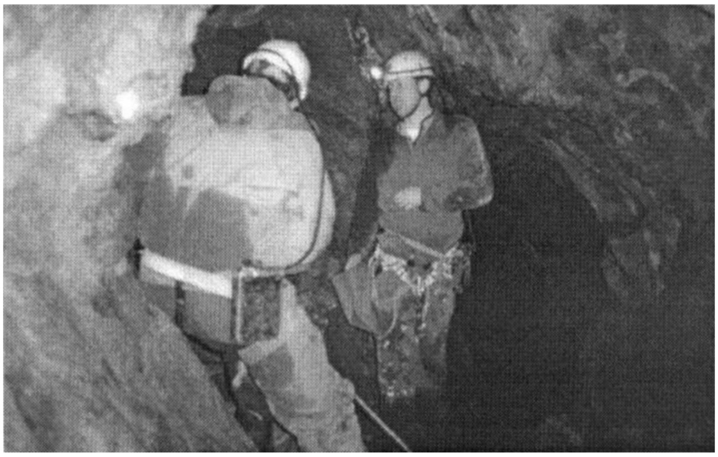
Logs across winze in Level 2

Some more Bwlch-y-plwm photos

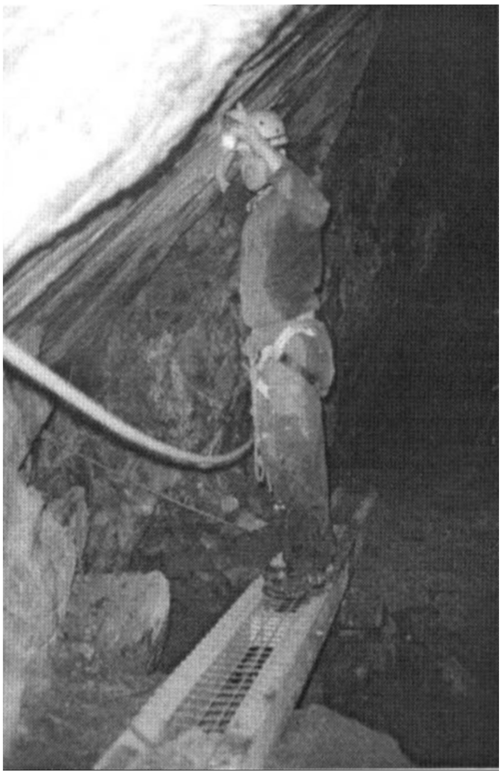
A fine figure of a man - Level 4 Adit Entrance



Rope traverse - Level 4



Pitch head - Level 3



A bridge too far? - Level 4

The top stopes area

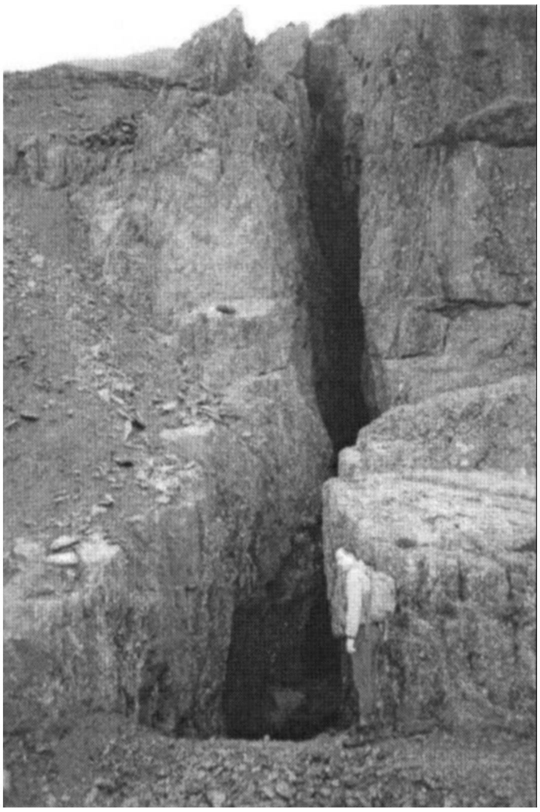
Lliwedd Copper Mine

by Robin Griffihs

On Sunday 16th of March Emyr and myself managed to go for a walk up to the Lliwedd Copper Mine. This was quite an achievement since it followed the traditional day in the pub watching the Wales vs. England rugby match. The approach is pleasant and easy and is achieved by following the old Miner's Path where it splits off the Watkin Path near the Hafod-y-Llan buildings. An old mine trail traverses the side of Lliwedd passing a trial level just to the left of the path before reaching the Lliwedd Mine proper.

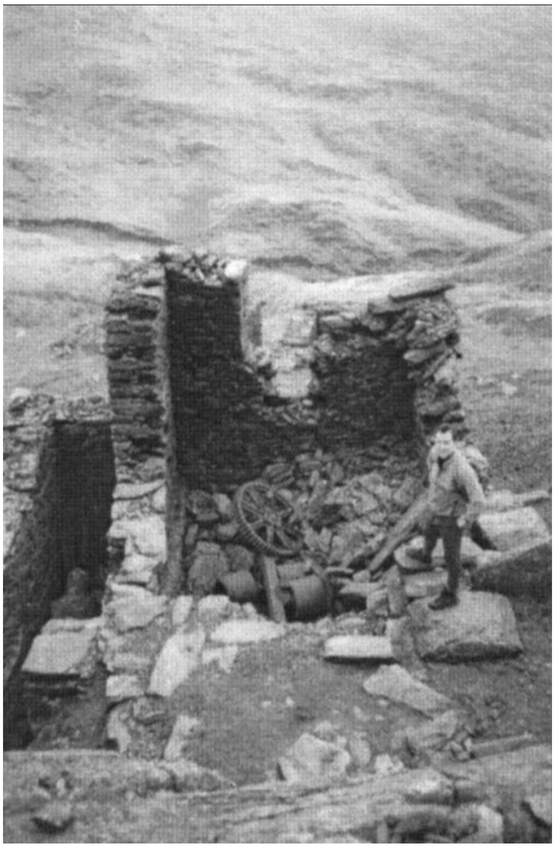
At the bottom of large reddish tips are the remains of two water powered crushing mills with wheel pits. In the upper mill are the remains of crushing rollers and segments of a water wheel. Just below is a paved dressing area. Above the buildings at the head of the first tip is the main adit portal with 18" gauge rail tracks.

Equipped with a £3 lamp from Warws I followed the level through water for about 100m leaving Emyr on the surface. At the end of the level was a collapse, but 5 minutes of digging saw me through to the bottom of a 80' stope up to surface. I had a brief if mumbled conversation with Emyr high above before venturing onwards to a continuation passage with a large, blind stope.



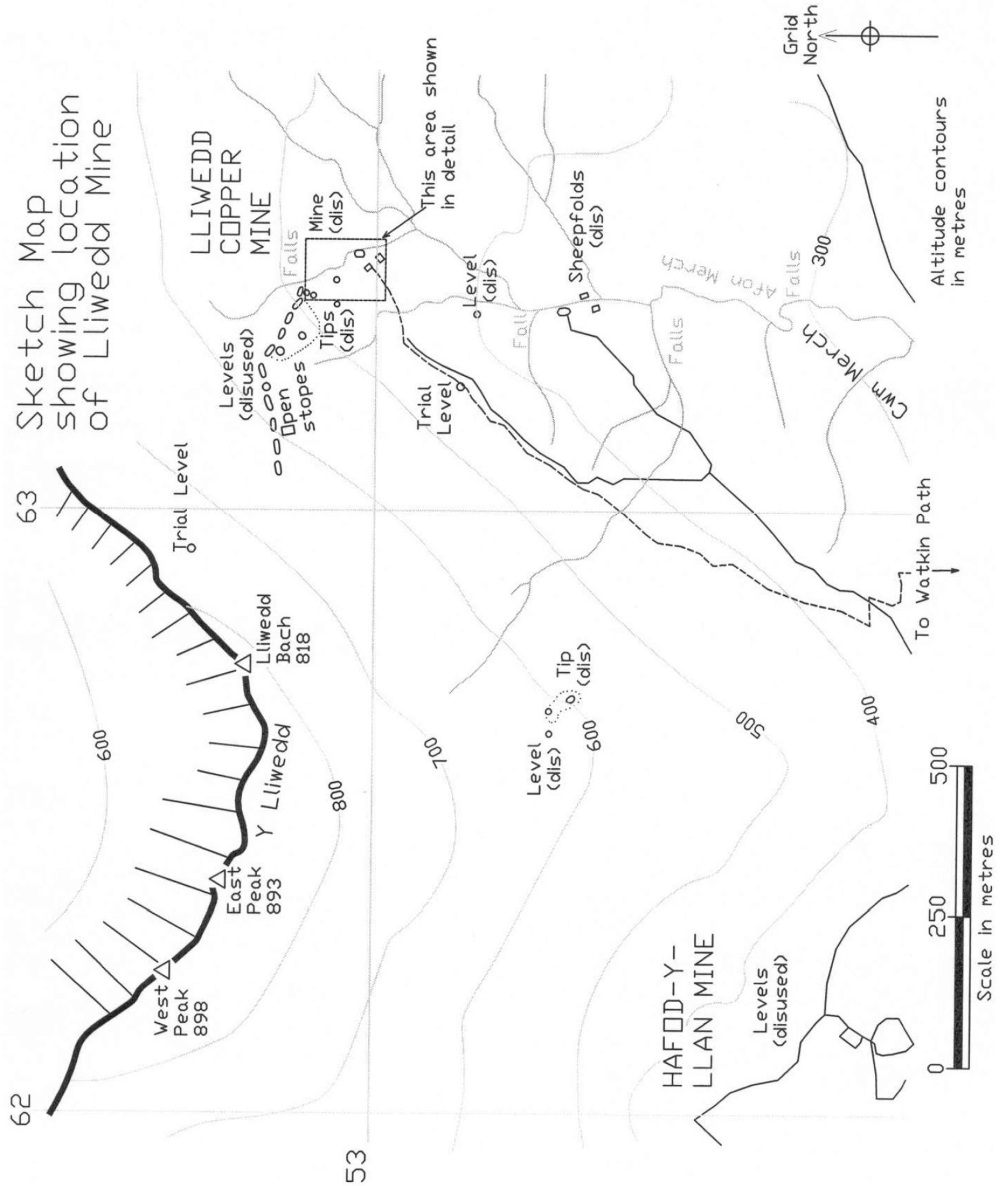
Cavernous stopes

Upon exiting I joined Emyr on the surface and went to look at the stopes from above. From this area there is a continuous line of stopes leading up the hillside for about half a kilometre. The stopes are about 100' deep, 3-4' wide and appear treacherous. We followed the stopes to their conclusion only about 400' short of the summit of Lliwedd. In one or two places, it might be possible to freeclimb the stopes with the aid of a rope. It should be possible to do a through trip from the top stope to the bottom portal, but the uncertainty about any internal pitches, amount of rope required and belay availability might make this tricky - nevertheless it could be a pleasant trip in the summer. ⇨



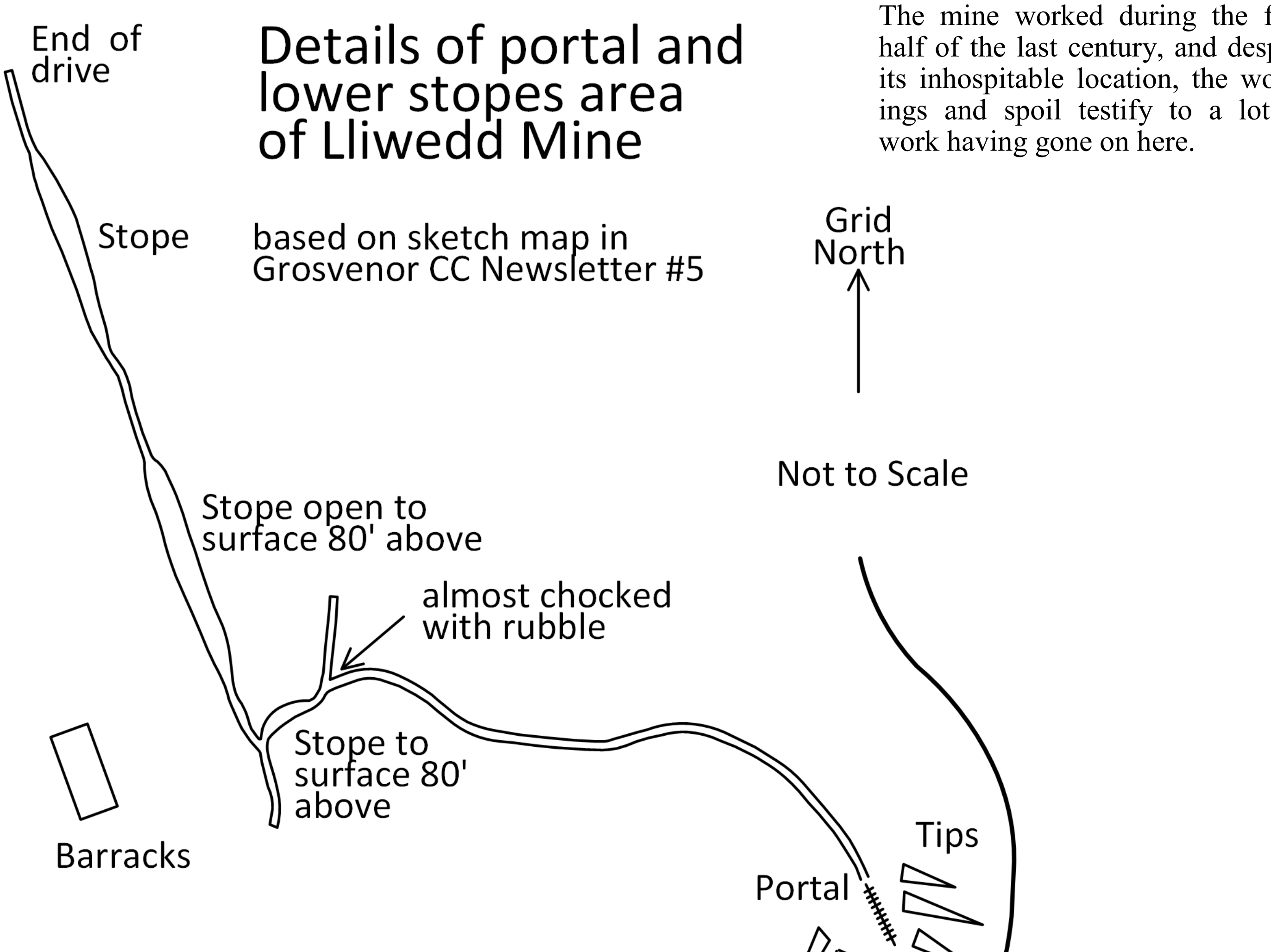
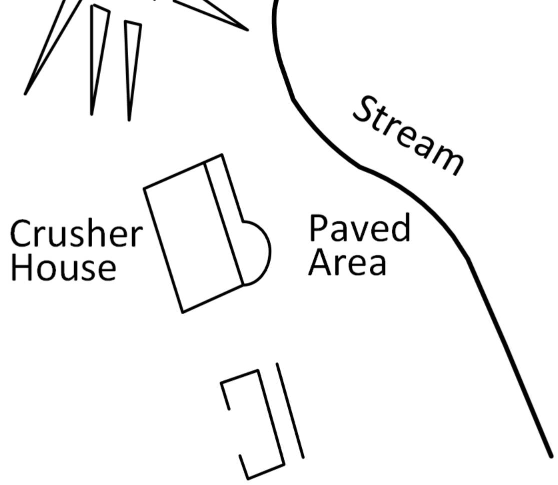
The crusher house and remains

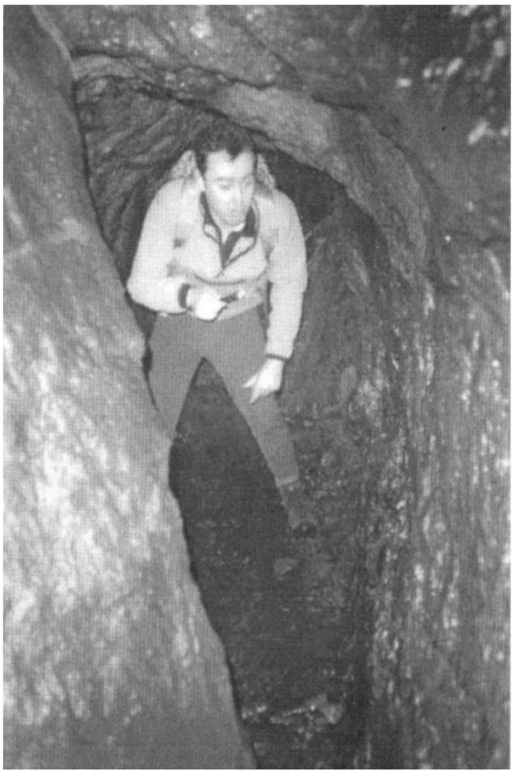
Looking downhill along line of stopes towards the mill



Sketch Map showing location of Lliwedd Mine

The mine worked during the first half of the last century, and despite its inhospitable location, the workings and spoil testify to a lot of work having gone on here.



Details of portal and lower stopes area of Lliwedd Mine
based on sketch map in Grosvenor CC Newsletter #5
End of drive
Stope
Stope open to surface 80' above
almost chocked with rubble
Stope to surface 80' above
Barracks
Grid North
Not to Scale
Tips
Portal
Stream
Crusher House
Paved Area



A well equipped explorer in the top stopes

A series of (very belated) reports from BD

by Brian Davies

If you've been waiting in anticipation for '*Ogofa 5*' to hit the news stands then look no further for someone to blame for the delay. (Ed. In fact you're not quite the last. The 2nd half of the *Ogofa* articles are in late submission order!) I humbly beg your forgiveness and ask that you accept my pathetic excuses: what with moving house, my daughter's wedding and the *old trouble* (writers cramp?), I've scarcely had time to do any caving let alone write this sort of bullshit. Incidentally, about the new house, it's got quite a reasonable static caravan on site so if any of you readers fancy a good value for money holiday at a peaceful rural location on ANGLESEY don't hesitate to get in touch.

Tenerife, February '96

Team: Robin, Dean and Rhian, Eric and Kim, myself

Dean had sorted out the accommodation and travel arrangements so the rest of us just had to turn up on the day appointed, bundle our luggage into the 'Beast' and then relax for a week without any stress. However, blood pressures rose along with the temperature gauge just before Corwen. Fortunately the fire was soon put out and the rewire under the bonnet took but half an hour. We spent a night at Dean's sisters (Kim) and took in the delights of the dockside pubs in Poole before turning in for the night.

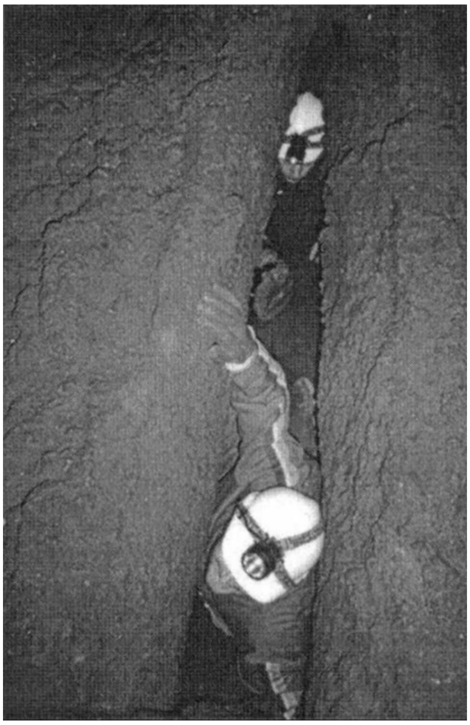
The contents of my hand luggage caused a little concern when X rayed and I felt like a small boy being asked to empty out his pockets for the headmaster to see. The fishing gear, GPS unit, Swiss army knife and camera accessories seemed acceptable but the crampons? "What are these things for ?" asked the stern, uniformed gentleman. "Self defence." I said, hoping to break the ice with a bit of witty banter. A bad idea - the said gentleman took the items along with a couple of 'Cygume' light sticks to his supervisor who did seem to have more of a sense of humour and accepted that most people going on holiday to a sunshine holiday island might need crampons. He was more concerned about the light sticks not having seen them before and fearing they may contain lethal chemicals and poison the passengers and crew.

'The Beast' - Conflagration - engine fire near Corwen

We left a very cold and miserable Gatwick on an Air 2000 757 and enjoyed the pleasures of aircraft food and watched the 'Net' on screen. Tenerife greeted us with sunshine and the snow capped summit of Teide looking resplendent above the cloud.

'The Beast' - Rush hour on A34 near Oxford - flat tyre

We picked up a hire car and drove to the quiet hamlet that Dean had arranged for us to stay - Playa De Las Americas. We unpacked our kit in the Laguna Park and first on the agenda of the action packed week was a visit to the water park. Robin, Dean and myself spent a good couple of hours on such treats as the 'Teide Twister'. The evening was spent exploring the inns and other watering holes that the place has to offer We found a nice British bar close to the hotel where we could be verbally abused by the Irish bartender. We tried to visit it every evening before turning in. ⇨



A Grande Hombre in a bit of a squeeze

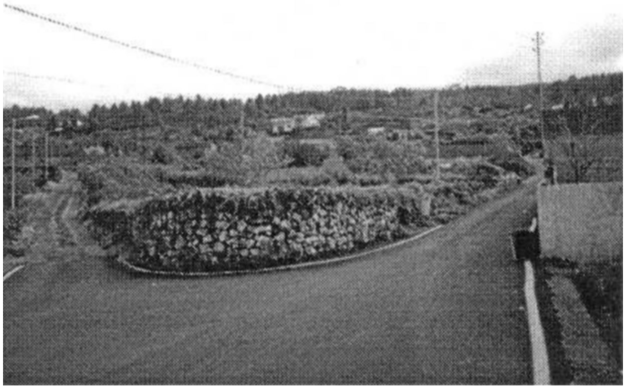
The week progressed at a break neck pace and included some of the following on our schedule :-

Horse riding on the beach and getting pissed on Sangria (both firsts for me).

A Medieval night followed by the ('genuine') Drifters and getting pissed on wine.

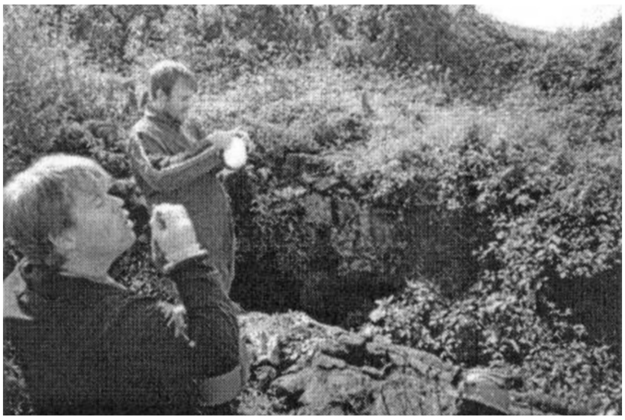
A barbecue evening with a soul band and getting pissed on 'Dorado' (the local lager).

Located at the Western end of the island is a tiny village called Masca. This is positioned at the head of a gorge which has a delightful footpath to the sea some 2000' lower. This walk was one of the highlights of the week for me and would recommend anyone visiting Tenerife to make the effort to do it.



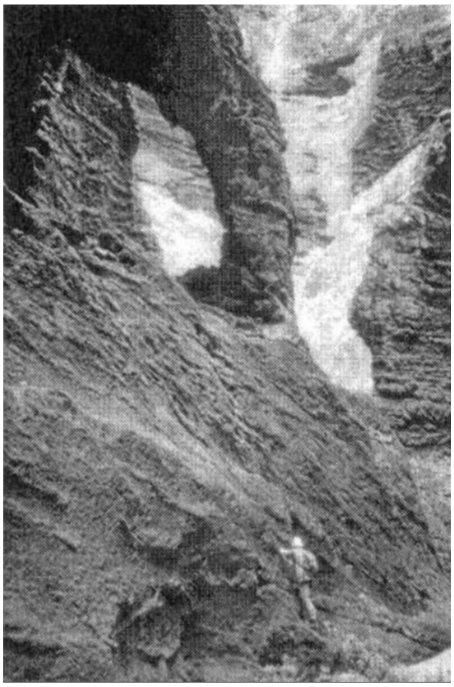
The improbable entrance location of Cueva de la Vientes

Speaking of visiting delightful locations, my caravan would make an ideal base for exploring the mountains and mines of Snowdonia as well as Anglesey itself and is available from £65 inc. gas and elec.



The entrance

Back to Tenerife now and considering that this is a caving publication I'd better at least mention the caving trip. I have actually forgotten the name of the only cave visited (Ed. Cueva de la Vientes) but it is situated above the town of Icod de los Vinos.



Spectacular scenery in the Masca Gorge

For the uninitiated these caves are unlike British caves being formed by lava flowing rather than the action of water. The cave we chose for a look was one of the longer ones at ***** metres, (Please help me out here Ed! Ed: I don't have the relevant information, but 10km rings a bell.) but progress is rapid because of the size and lack of floor debris. Points worth mentioning for prospective visitors are :-

Try and take a good light, the walls are almost black.

Remember to take some gloves - I didn't and was covered in grazes when I emerged.

The real highlight of the week for me was the ascent of Mt. Teide. We had planned to go up via the cable car but it was shut down because of the high winds. This was disappointing for Eric and the girls but I was looking forward to the challenge. OK, the ascent is only 4500', but at 12,000'+ the altitude does make a difference. ⇨

Teidi Summit - 12,156ft. A very cold Robin with caldera behind

B. Davies

Mount Teidi, a line of resistant dykes extends to foreground

We (Dean, Rob and myself) elected for the 'direct' route along the route of the cable car because it was the shortest. It is also the steepest and possibly the one loosest under foot. The first section was harder than putting on roller skates and ascending the 'Great Stone Chute' on Skye: Two steps up and three down. Dean did not get very far -feeling the effects of the previous evenings visit to the Medieval Night he soon retired. Robin and myself progressed up in stages resting at each of the 6 supporting pylons of the cable-way and getting ready to curse if the thing started up. It never did, the reason becoming clear when we arrived at the summit. Although at the base station the sun was shinning, and people clothed in nothing more substantial than shorts, on the summit the wind was a strong gale force. The wind chill factor brought the temperature down to a dangerous level and required the donning of every scrap of clothing I had with me. The top 500' of the summit cone had a fresh covering of snow and some icing but did not require the use of crampons. Impressive were the sulphurous vapors being vented close to the summit crater and sulphur crystals forming on the rocks within the rim. Mt. Teide last erupted as recently as 1909.

After a couple of photos we descended very quickly, scree running most of the way down, but stopping occasionally to take in the view of the huge caldera below us. (I watched with interest the film 'One Million Years BC' shown on TV soon after our return home: this film was made here.)

Other things we lid in the name of amusement were snorkeling, fishing, 'timeshare tout' harassing and Badger baiting (no, not really - we never found any). Must visits include Veronicas and the 'Wigan Pier' club - the drag artist was a 'Gem'. However, don't go if of a sensitive nature (or a sheep shagger).

All in all I'd recommend everyone to visit Tenerife as I would Anglesey and stay in my caravan for the week.

For those interested, a short resume of the Canaries gleaned from the Grollier encyclopedia

The Canary Islands are volcanic peaks rising above the Atlantic Ocean some 113 km (70 mi.) from the coast of northwest Africa and about 1,100 km (680 mi.) from Spain, to which they belong. The name Canary is derived from the name of a wild dog once found there. The name was later given to the small greenish yellow bird still found there. Seven islands - Gran Canaria, Tenerife (the most populous), Gomera, Ferro, La Palma, Fuerteventura, and Lanzarote, together with a few, mostly uninhabited islets make up the group. About 7,273 sq. km (2,808 sq. mi.) in area, the Canaries are mountainous; Tenerife rises in the Pico de Teide to 3,706 m (12,156 ft). The most recent volcanic eruption occurred in 1909.

The islands are situated at about 28 degree N latitude, in the belt of the northern trade winds. Their climate is tropical. Rainfall, generally less than 508 mm (20 in) a year, comes mainly in the winter, when snow falls at high elevations. Flora is varied, with only the aridity of some parts of the islands restricting growth. At lower altitudes the terrain is semi-desert.

Most of the population is of Spanish descent, but they distrust mainland Spain; their language is Spanish; and they practice Roman Catholicism. Most work in agriculture. Vineyards, which formerly covered much of the fertile volcanic soil, have yielded to banana plantations. Sugarcane, tomatoes, and early vegetables are also grown for export. The largest towns, Santa Cruz De Tenerife and Las Palmas de Gran Canada, have lucrative tourist industries.

Known to the Romans as the "Fortunate Isles", the Canaries were later forgotten and then rediscovered by the Arabs. They came under Spanish rule in 1479. In 1927 the island group was divided into two provinces: Las Palmas (1984 est. pop., 754,949), covering the eastern islands, and Santa Cruz de Tenerife (1983 est. pop., 671,473), covering the western.

Kirk Gill Cave and Pot GR SD 924778

8th July 1996. Team: Brian Davies, Mike Lamb and Albert

by Brian Davies

Not a club trip but one I slipped in whilst doing the Dales Way last year with a group of friends (The Dinorwig Power Station Ramblers Association Affil.). I arranged a short day to end in Buckden to give an opportunity to do a bit of caving whilst in the Dales (seemed a waste not to!) and introduce the sport to a couple of curious friends.

We parked at the pub in Hubberholmes (for future reference its worth noting it has a camp site) and walked the short distance to the cave. Unfortunately for Mike, the entrance is a bit on the small size and he is a bit on the large size so he made a retreat to the pub. He didn't seem too disappointed by this.

Fortunately on the other hand Albert fitted easily and made his first descent into a pothole. The entrance pitch is only 3.5m but quite tight at the top made it awkward for the novice Albert. The recent wet weather also added atmosphere to the event and a good soaking was had as we made our way to the link with Kirkgill Cave. The short streamway was in good flow so we abandoned the through trip and returned to the surface to enter the cave from the other end. All in all a nice little jaunt and well worth the effort of carrying 3 miners lamps and the SRT gear all the way from Ilkley. We arrived at the pub (the name escapes me at the moment) and found Mr. Lamb just as he was at the bar. We dried off in front of the fire blaming the pool of water under the seat on the cat. I promised Mike that I'd select a more generous sized hole next year!

B. Davies

Rob at rebelay - Rowten Pot

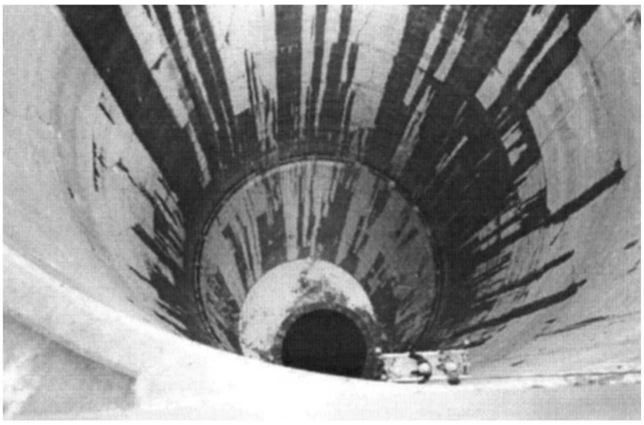
B. Davies

Cabin Shaft rescue practice

B. Davies

Team photo - somewhere in Cwmorthin!

B. Davies



Some poor bugger on gantry above surge pond - Dinorwic PS

The rest of the caving activity since *Ogofa 4* will I'm sure, be reported on by others but for completeness here is a brief account of the few trips attended by myself during this period.

10 April 96 - Cave rescue practice - Cabin Shaft Mine, Minera Mountain.

2nd May and many other dates - Cwmorthin / Oakley slate mines

25th May - Trip to Yorkshire staying at Glebe farm - very convenient for the Marton arms but a bit lacking in facilities. The group was Robin, Richard and Mandy and Myself and son Robert visiting Tatham Wife Hole, Rowten Pot and Aygill Cavern.

Many dates in August and September - the various copper mines around Llanfrothen.

6th Oct. 96 - Cave rescue practice at Bwlch Y Plwm. I was very pleased at my first attempt in the use of video underground and the finished product is available for a modest fee (for club funds of course).

11th /12th Jan 97 - Yorkshire Group - Robin, Dean Robert and Myself. Short drop through to Gavel pot, Deaths Head Cavern. Big Meanie proved a big disappointment; As much as I tried I just would not fit. I'll be back! Marble Steps pot via the Wet Route'.

Of Sharp Edges and Tin Men

No.2 in an occasional series of mountain anecdotes by Emyr Rees

Regular readers will know that the members of the club are all keen mountaineers, and the two disciplines are often mixed during a “trip”. Our late February weekend trip to the Lakes however was to be a purely mountain affair, involving Robin Griffiths, myself and Clive Owen.

Our 7.30am Friday morning start was delayed unexpectedly by Clive’s sheep dog. Upon our arrival he managed to escape from the house and despite Clive’s commands, went bounding up the road. There followed an almost surreal chase around the quiet back lanes of Waunfawr involving the dog followed gamely by Clive (running and shouting) and myself and Robin (laughing in the car). Eventually the dog allowed Clive to catch up and we all returned to the house in the car.

After all this excitement, the rest of the trip threatened to be a big anti climax, but by midday we’d reached Cumbria and the first of our intended peaks - Helvellyn. We made our approach from Glenridding in the east and followed a horse shoe route which takes in Striding Edge and Swirral Edge. This mountain has more memorials than any other in the UK and indeed there did seem to be plenty of places where you could fall off! Striding Edge itself wasn’t too bad but the descent immediately from the summit on to Swirral Edge was still very icy. Luckily I’d brought my backside with me and I made extensive use of it whilst negotiating this particular stretch!

You’ll be sorry! Sharp Edge, Blencathra

Our accommodation was at The Kings Head in Thirlmere, where that evening we had a quiet night in. I showed the boys how to lose spectacularly at pool and Clive began to take a macabre interest in the decor, but more of that later.

By the following day we’d all agreed that the trip should contain more ridge walks. Having found the dreaded Striding Edge so easy we were filled with bravado and decided to take on possibly the most revered ridge in the Lakes - Sharp Edge. This is found just below the summit of Blencathra; Chris Bonnington’s favourite mountain in the Lakes according to Clive and so with thoughts of “warming up hot beefy Bovril” we set out.

On the approach walk we passed what seemed to be dozens of Chinese people, studying their maps. We strode purposefully by, playing the experienced hardened

⇨

Emyr & Clive on Striding Edge, Helvellyn

mountaineers. Later, I nearly came to regret this, when during a panoramic vista break my back pack (which I'd placed at my feet) started to roll back down the hill. I gave chase while Robin and Clive shouted encouragement, but I soon gave up when I realised it was heading for the top of a tall cliff. I immediately had visions of having to walk back down the path, past the Chinese to retrieve my pack, luckily it came to rest within feet of the precipice. However I did lose my binoculars at some point on this trip. I strongly suspect that they fell out of my pack as it rolled down the hill and probably now have a new home in downtown Beijing.

Meet the 'Tin Man'

By the time we reached Blencathra itself the wind and the rain had picked up significantly. We could see Sharp Edge by now and it looked, ...

... well ... - sharp! Other routes to the summit did seem possible but we decided to at least go and have a look. There did seem to be some other people on the ridge and we came across another trio determined on the same route. As we got closer though it was obvious that all was not well. Two parties in front of us had turned back and told us of wet slippery, slate like rock coupled with high winds. Even before getting on to the ridge itself there was a steep traverse across very loose ground. There was a group of about seven on the ridge but they were making slow progress and they were roped up. We didn't have a rope and didn't really fancy getting into the sort of situation that required one but I was determined to at least get up on to the ridge even if it was only to look across it.

Robin came up on to the ridge with me and although it was only a short stretch it was very wet, very windy, and as we say in the trade - *very pointy*. Robin decided to stage a tactical withdrawal and I would have joined him, but in the meantime I'd heard some of the boys who were on the ridge shouting to one another and they spoke Welsh! Now I'm a sucker for this sort of thing so I yelled across and asked if I could join them. I turned out that I needed their help to guide me around the final part of the ridge which had a twenty foot drop and in those conditions was very, how can I say, *intimidating*.

On the top I met up with Robin and Clive, who'd found a straightforward way around. We all agreed that I'd been reckless to cross the ridge in those conditions. I promised I wouldn't do it again and we set off down the mountain. The neighbouring peak of Skiddaw had been next on our itinerary but by the time we reached the car the rain had really started to come down. In point of fact I was quite city due to the judicious use of my purple Gortex over-trousers, the benefits of which I often drone on about, much to everybody else's annoyance. However, taking into account my earlier recklessness I decided to exercise discretion here and Skiddaw was abandoned.

That evening we went into Keswick. To our immense disappointment the public library had shut and only the local hostelries offered any shelter from the driving rain. Once again Clive impressed me with his prolific thirst (dehydration is a terrible thing) and we rounded the evening off with three of the hottest Chicken Vindaloos known to man.

Later back at the hotel, having persuaded the staff that they didn't want to shut the bar just yet, Clive decided to rearrange the furniture. In the reception area there was a very fine three foot high suit of armour - the 'tin

⇨

man'. When I finally went up to my room, I found that somebody'd put him in my bed. Robin then conducted a photo session which I've since come to regret. To be fair Clive did try and return our ornamental friend to his original position but I fear that the staff had by now become wise to our indiscretion.

The following morning the tin man had been placed safely behind reception, but we were in too much discomfort from the preceding nights curry to feel at all embarrassed. From my own experience I was forced to make three lengthy "visits". It felt as if my life was draining away and I feared whether I'd ever walk again, leave alone make it up a mountain.

Clive had decided that he wasn't going to join us on the last days outing and so it was to cries of "are you going to be all right now Grandad?" that myself and Robin set off for The Old Man of Coniston. Our route in fact also took in Wetherlam and Swirl How and must have been about nine miles long. This was a very fine day and an interesting walk but we were both feeling tired by the time we reached the car.

Caravan Hire in Scenic Snowdonia (much nicer than Anglesey anyway.)

Dean's caravan is available for hire at the discount price of £50 per week, including electricity, gas, water, satellite TV, jacuzzi and hostess service (no time wasters please). Ideal for the hills & mines of Snowdonia, Lakes, English Midlands, Tower of London, Grand Canyon, Olympus Mons, Metebelis III, The Pillars of Creation etc....

* * *

Addendum, Corrections and Notes

[†1] Page 13. I was studying Earth Science with the OU around this time, and this article looks like an over-enthusiastic opportunity to spew out some of the stuff I'd learned!

[†2] Page 18. Interesting to see how much has changed and how much remains the same software-wise after 25 years. Page Plus proved to be problematic in that its file format appeared to be insanely prone to corruption. So I lost most of the DTP layouts despite having the files safely stored on backups! These versions have been re-mastered using Microsoft Publisher. Drawings using Microsoft Visio.

[†3] Page 21. I visited Cae Fali some time later where a wet adit can be entered, passing underneath the Ffestiniog Railway, with an exit up a climbable shaft on the other side of the railway.

[†4] Page 21. Andy Goodall and I did have a look here later. The open stopes had far too much loose stuff to make a safe descent. The shaft I mentioned could be tripoded, but the Deep Adit appears to have been opened up in the early 21st C. Shamefully, apart from viewing the open adit, I've never been in.

[†5] Page 22. The Betws Garmon mines go under several different names, the upper workings being Garreg Fawr, the lower being Ystrad or Silurian. The mine was still operating in 1907 when a 4.7km aerial ropeway was constructed to take ore over the shoulder of Cefn Du down to the railway at Llyn Padarn.

[†6] Page 27. This adit was re-opened towards the end of the 20C. In fact quite a few were in North Wales around the same time. Quite likely by a mine enthusiast from the Midlands!

[†7] Page 39. Why was the practice casualty was being taken up the shaft rather than out of the Deep Adit? The rescue scenario was that this was a shaft rescue and Level 4 and Deep Adit had been taped off so the rescuers were *forced* to enter and leave via the top entrance.
Co-incidentally, there was a real rescue from BYP a few years later where the casualty had fallen some way down the shaft and was evacuated out of the Deep Adit. The same trick of manouvering the stretcher around the deep pool on people's knees was used then as well!